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OF THE

SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION

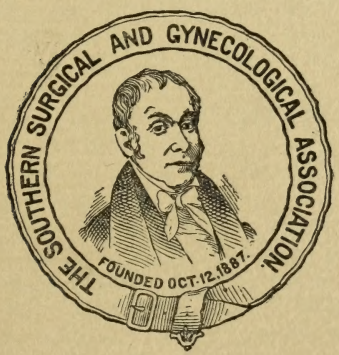
VOLUME XVI.

SIXTEENTH SESSION,

HELD AT ATLANTA, GEORGIA,

DECEMBER 15, 16 AND 17, 1903.

EDITED BY W. D. HAGGARD, M.D.



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LIST OF OFFICERS

FROM THE ORGANIZATION TO THE PRESENT TIME.

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1888.	*W. D. Haggard.	R. D. Webb. J. W. Sears.	*W. E. B. Davis.	Hardin P. Cochrane.
1889.	*Hunter H. McGuire.	W. O. Roberts. *Bedford Brown.	*W. E. B. Davis.	Hardin P. Cochrane.
1890.	*George J. Engelmann.	Berthold E. Hadra. Duncan Eve.	*W. E. B. Davis.	Hardin P. Cochrane.
1891.	Lewis S. McMurtry.	*J. McFadden Gaston. J. T. Wilson.	*W. E. B. Davis.	Hardin P. Cochrane.
1892.	*J. McFadden Gaston.	Cornelius Kollock. George Ben Johnston.	*W. E. B. Davis.	Hardin P. Cochrane.
1893.	*Bedford Brown.	Joseph Price. George A. Baxter.	*W. E. B. Davis.	Hardin P. Cochrane.
1894.	*Cornelius Kollock.	A. B. Miles. J. B. S. Holmes.	*W. E. B. Davis.	Hardin P. Cochrane.
1895.	Louis McLane Tiffany.	Ernest S. Lewis. Manning Simons.	*W. E. B. Davis.	Richard Douglas.
1896.	Ernest S. Lewis.	Joseph Taber Johnson. Richard Douglas.	*W. E. B. Davis.	A. M. Cartledge.
1897.	George Ben Johnston.	W. E. Parker. Floyd W. McRae.	*W. E. B. Davis.	A. M. Cartledge.
1898.	Richard Douglas.	*H. H. Mudd. James A. Goggans.	*W. E. B. Davis.	A. M. Cartledge.
1899.	Joseph Taber Johnson.	F. W. Parham. W. L. Robinson.	*W. E. B. Davis.	A. M. Cartledge.
1900.	A. M. Cartledge.	Manning Simons. W. P. Nicolson.	*W. E. B. Davis.	W. D. Haggard.
1901.	Manning Simons.	George H. Noble. L. C. Bosher.	W. D. Haggard.	Floyd W. McRae.
1902.	*W. E. B. Davis.	J. Wesley Bovée. J. W. Long.	W. D. Haggard.	Floyd W. McRae.
1903.	J. Wesley Bovée.	Christopher Tompkins. Bacon Saunders.	W. D. Haggard.	Floyd W. McRae.
1904.	Floyd W. McRea.	George S. Brown. J. Shelton Horsley.	W. D. Haggard.	Charles M. Rosser.

* Deceased.

HONORARY MEMBERS.

1894.—Foy, George,	Dublin.
1902.—*Gaston, J. McFadden,	Atlanta, Ga.
1894.—Jacobs, Charles,	Brussels.
1894.—Martin, A.,	Berlin.
1902.—Maury, Richard B.,	Memphis, Tenn.
1894.—Morisani, O.,	Naples.
1894.—Pozzi, S.,	Paris.
1902.—Reamy, Thaddeus A.,	Cincinnati, Ohio.

* Deceased.

MEMBERS.

1894.—Baldridge, F. E., M.D. Huntsville, Ala.

1900.—Baldy, John Montgomery, M.D. Professor of Gynecology, Philadelphia Polyclinic; Surgeon to Gynecean Hospital; Gynecologist to Pennsylvania Hospital; Consulting Surgeon to Frederick Douglass Free Hospital. 1831 Chestnut Street, Philadelphia, Pa.

1903.—Balloch, Edward A., M.D. Professor of Surgery, Medical Department of Howard University; Surgeon to Freedmen's Hospital; Member American Academy of Medicine. 1013 Fifteenth Street, N. W., Washington, D. C.

1901.—Baughman, Greer D., M.D. Lecturer on Hygiene; Demonstrator of Pathology; Demonstrator of Physiology; in charge of Gynecological Dispensary at Medical College of Virginia. 12 North Second Street, Richmond, Va.

1900.—Black, James Madison, M.D., B.S. Consulting Surgeon Southern Railway. West Church Avenue, Knoxville, Tenn.

1893.—Bloom, J. D., M.D. Surgeon-in-Charge, Charity Hospital; Consulting Surgeon, Touro Infirmary; Lecturer on Diseases of Children, Tulane University. New Orleans, La.

1901.—Boldt, Hermann J., M.D. Gynecologist to Post-Graduate Hospital, St. Mark's Hospital, German Polyclinic; Consulting Gynecologist, Beth Israel Hospital; Professor of Gynecology, Post-Graduate Medical School. 39 East Sixty-first Street, New York, N. Y.

1902.—Bonifield, Charles Lybrand, M.D. Professor of Clinical Gynecology, Medical College of Ohio (Medical Department University of Cincinnati); Member American Association of Obstetricians and Gynecologists; ex-President Cincinnati Academy of Medicine; ex-President Cincinnati Obstetrical Society. 432 West Fourth Street, Cincinnati, O.

1890.—Bosher, Lewis Crenshaw, M.D. Professor of Practice of Surgery and Clinical Surgery in the Medical College of Virginia; Visiting Surgeon to the Memorial Hospital; Member of American Surgical Association; Member of the American Association of Obstetricians and Gynecologists;

Member of Association of American Anatomists; Member of American Urological Association; Member of Tri-State Medical Association of the Carolinas and Virginia; Member of Virginia State Society; ex-President of Richmond Academy of Medicine and Surgery. *Vice-President*, 1901. 717 East Franklin Street, Richmond, Va.

1895.—Bovee, J. W., M.D. Gynecologist to Columbia and Providence Hospitals; Clinical Professor, Medical Department of Columbian University; Fellow of American Gynecological Society; Honorary Member, Virginia Medical Society; Member of Washington Obstetrical Society, the American Medical Association, and the Medical and Surgical Society, District of Columbia; *Vice-President*, 1902; *President*, 1903. 1404 H Street, N. W., Washington, D. C.

1889.—Brokaw, Augustus V. L., M.D. Professor of Anatomy in the Missouri Medical College; Assistant to the Chair of Surgery and Senior Assistant Surgeon, St. John's Hospital. Cor. Washington Boulevard and Taylor Ave., St. Louis, Mo.

1902.—Broome, G. Wiley, M.D. Consulting Surgeon St. Louis City and Female Hospitals; Member St. Louis Medical Society. 407 North Grand Avenue, St. Louis, Mo.

1898.—Brown, George S., M.D. Ex-President Jefferson County Medical Society. *Vice-President.* Birmingham, Ala.

1897.—*Bryson, John P., M.D.

1899.—Burthe, L., M.D. 124 Baronne Street, New Orleans, La.

1900.—Byford, Henry T., M.D. Professor of Gynecology, College of Physicians and Surgeons (University of Illinois), Chicago; Professor of Clinical Gynecology, Northwestern University Woman's Medical School; Professor of Gynecology, Chicago Post-Graduate Medical School; Professor of Gynecology, Chicago Clinical School; Surgeon to Woman's Hospital; Gynecologist to Chicago West Side Hospital. Reliance Building, 100 State Street, Chicago, Ill.

1902.—Caldwell, C. E., M.D. Professor of Orthopedic Surgery, Miami Medical College; Visiting Orthopedic Surgeon, Cincinnati Hospital; Member Cincinnati Academy of Medicine. 1110 Cross Lane, Cincinnati, O.

1903.—Carr, William P., M.D. Professor of Physiology and Professor of Clinical Surgery, Columbian University; Surgeon to the Emergency Hospital and University Hospital;

* Deceased.

Consulting Surgeon to the Washington Asylum Hospital and the Government Hospital for the Insane, Washington, D.C. 1418 L Street, N. W., Washington, D. C.

1891.—Cartledge, Abiah Morgan, M.D. Professor of Gynecology and Abdominal Surgery, Louisville Medical College; Visiting Surgeon to the Louisville City Hospital; Surgeon to the Louisville Home of the Friendless; ex-President of the Louisville Medico-Chirurgical Society. *Treasurer*, 1896–1899; *President*, 1900. 205 West Broadway, Louisville, Ky.

1899.—Cathcart, R. S., M.D. Assistant to Chair of Clinical Surgery in the Medical College of the State of South Carolina. 66 Hasell Street, Charleston, S. C.

1893.—Cocram, Henry S., M.D. 124 Baronne Street, New Orleans, La.

1893.—Coley, Andrew Jackson, M.D. Councillor of the Medical Association of the State of Alabama. Alexander City, Ala.

1902.—Coley, William B., M.D. Clinical Lecturer on Surgery, College of Physicians and Surgeons; Assistant Surgeon in Hospital for Ruptured and Crippled; Attending Surgeon to General Memorial Hospital; Fellow of the American Surgical Association, New York Surgical Society, and New York Academy of Medicine. 5 Park Avenue, New York, N. Y.

1902.—Crile, George W., M.D. Professor of Clinical Surgery, Medical College of Western Reserve University; Surgeon to St. Alexis' Hospital; Surgeon to Lakeside Hospital. 275 Prospect Street, Cleveland, O.

1893.—Crofford, T. J., M.D. Professor of Physiology and Clinical Lecturer on Gynecology in the Memphis Hospital Medical College. 155 Third Street, Memphis, Tenn.

Founder.—Cunningham, Russell M., M.D. Professor of Practice of Medicine and Clinical Medicine, Birmingham Medical College; Surgeon to the Pratt Mines Hospital. Ensley, Ala.

1894.—Dandridge, Nathaniel Pendleton, M.D. Professor of Surgery, Miami Medical College; Surgeon to Cincinnati Hospital and Episcopal Hospital for Children. 422 Broadway, Cincinnati, Ohio.

Founder.—Davis, John D. S., M.D. Professor of Principles and Practice of Surgery and Clinical Surgery, Birmingham Medical College; formerly Gynecologist to Birmingham Hospital of United Charities; formerly Chairman of the Judicial Council of the Alabama Surgical and Gynecological

Association; ex-President of the Jefferson County Medical Society and of the Board of Health. 2031 Avenue G, Birmingham, Ala.

Founder.—*Davis, William Elias Brownlee, M.D.

1891.—Dean, G. R., M.D. Fellow of the American Association of Obstetricians and Gynecologists; President of South Carolina State Medical Association; ex-President Association of Surgeons of Southern Railroad. Spartanburg, S. C.

1900.—Deaver, John B., M.D. Surgeon-in-Chief to the German Hospital. 1634 Walnut Street, Philadelphia.

1901.—Dibrell, James A., M.D. Dean Medical Department, University of Arkansas. Little Rock, Ark.

1892.—Dixon, Archibald, M.D. Ex-President of the Kentucky State Medical Society; ex-President of the McDowell Medical Society; ex-President of the Mississippi Valley Medical Association. Henderson, Ky.

1897.—Dorsett, Walter B., M.D. Professor of Obstetrics and Clinical Gynecology, Marion Sims-Beaumont Hospital Medical College; Gynecologist to the Missouri Baptist Sanitarium and to Evangelical Deaconess' Hospital. 3941 North Belle Place, St. Louis, Mo.

1896.—Doughty, W. H., M.D. Professor of Anatomy and Clinical Surgery, Medical Department, University of Georgia. 822 Greene Street, Augusta, Ga.

Founder.—Douglas, Richard, M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; Fellow of the British Gynecological Association. *Treasurer*, 1895; *Vice-President*, 1896; *President*, 1898. 110 South Spruce Street, Nashville, Tenn.

1903.—Downes, Andrew J., M.D. 1725 Girard Avenue, Philadelphia, Pa.

1902.—Dudley, A. Palmer, M.D. Professor of Diseases of Women, New York Post-Graduate Hospital and Dartmouth Medical College; Member International Gynecological Society, American Gynecological Society, New York Obstetrical Society, and New York Academy of Medicine. 678 Madison Avenue, New York, N. Y.

1900.—Dunning, Lehman Herbert, M.D. Professor of Diseases of Women, Medical College of Indiana; Consulting Gynecologist to Indianapolis City Hospital and Dispensary. 224 N. Meridian Street, Indianapolis, Ind.

* Deceased.

1890.—Earnest, J. G., M.D. Professor of Clinical Gynecology, College of Physicians and Surgeons; formerly Professor of Gynecology, Southern Medical College; Visiting Gynecologist to the Grady Hospital. Atlanta, Ga.

1891.—Elkin, William Simpson, M.D. Professor of Operative and Clinical Surgery, Atlanta College of Physicians and Surgeons; ex-President of the Atlanta Society of Medicine; Surgeon to Grady Hospital. 27 Luckie Street, Atlanta, Ga.

1900.—Ellis, James N., M.D. 19 Forest Ave., Atlanta, Ga.

1889.—*Engelmann, George J., M.D.

1900.—Ferguson, Alexander Hugh, M.D. Professor of Surgery, Chicago Post-Graduate; Professor of Surgery, Medical Department (College of Physicians and Surgeons), University of Illinois. 10 Drexel Square, Chicago, Ill.

1901.—Fort, Rufus E., M.D. Formerly Superintendent Nashville Hospital. 209 North Vine Street, Nashville, Tenn.

1895.—Fortier, S. M., M.D. Visiting Surgeon to Charity Hospital. 4422 St. Charles Avenue, New Orleans, La.

1902.—Freiberg, Albert H., M.D. Professor of Orthopedic Surgery, University of Cincinnati (Medical College of Ohio), and in the Laura Memorial Women's Medical College; Orthopedic Surgeon to the Cincinnati, Presbyterian, and Jewish Hospitals; Fellow of the American Orthopedic Association. 708 Walnut Street, Cincinnati, O.

1895.—Fry, Henry D., M.D. Professor of Obstetrics, Georgetown University. 1601 Connecticut Avenue, N. W., Washington, D. C.

1903.—Gale, Joseph A., M.D. Surgeon-General Norfolk and Western R. R.; President of Medical Society of Virginia; Member of American Medical Association and of Roanoke Medical Society. Roanoke, Va.

1900.—Gaston, J. McF., Jr., A.M., M.D. 421 Capital Avenue, Atlanta, Ga.

1890.—*Gaston, J. McF., Sr., M.D,

1900.—Gerster, Arpad G., M.D. Attending Surgeon to Mt. Sinai Hospital; Consulting Surgeon to the German Hospital. 34 East Seventy-fifth Street, New York, N. Y.

1898.—Gessner, Hermann B., A.M., M.D. Chief of Clinic to Chair of Surgery, Tulane University of Louisiana; Visiting Surgeon, Charity Hospital; Demonstrator of Operative Surgery, Tulane University of Louisiana; Professor of Anatomy

* Deceased.

and Surgery, New Orleans College of Dentistry; Secretary Louisiana State Medical Society; First Vice-President Orleans Parish Medical Society. 830 Canal Street, New Orleans, La.

1902.—Gillespie, Reese B., M.D. Member of the Medical Society of Virginia; Secretary and Treasurer Tazewell County Medical Society; Surgeon to the Tazewell Sanitarium. Tazewell, Va.

1897.—Glasgow, Frank A., M.D. Professor of Clinical Gynecology of St. Louis Medical College; Gynecologist to St. Louis Mullanphy Hospital; on Staff of Mission Baptist Sanitarium and of Martha Parsons Free Hospital; Consulting Surgeon to St. Louis Female Hospital. 3894 Washington Boulevard, St. Louis, Mo.

1903.—Goffe, J. Riddle, M.D. Professor of Gynecology, New York Polyclinic Medical School and Hospital; Gynecologist, New York City Hospital; Assistant Gynecologist to New York Skin and Cancer Hospital; Consulting Gynecologist, St. Joseph's Hospital, Yonkers, N.Y.; Fellow American Gynecological Society. 29 West Forty-sixth Street, New York, N. Y.

Founder.—Goggans, James A., M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; Senior Councillor of the Medical Association of the State of Alabama; Fellow of the British Gynecological Society. *Vice-President*, 1898. Alexander City, Ala.

1900.—Goldsmith, W. S., M.D. 262 Jackson Street, Atlanta, Ga.

Founder.—Graham, Joseph, M.D. Member Charlotte, North Carolina, Medical Society; ex-Member North Carolina State Board of Health, and North Carolina State Board of Medical Examiners; ex-President North Carolina State Medical Society. Charlotte, N. C.

1892.—Grant, Horace H., M.D. Professor of Surgery in the Hospital College of Medicine; Surgeon to the Louisville City Hospital. 321 Equitable Building, Louisville, Ky.

1896.—Gwathmey, Lomax, M.D. Attending Gynecologist to St. Vincent Hospital and Dispensary. Norfolk, Va.

Founder.—Hadra, Berthold Ernest, M.D. Formerly Professor of Surgery, Texas Medical College and Hospital; ex-President of the West Texas Medical Association. *Vice-President*, 1890. Dallas, Texas.

1896.—Haggard, William David, M.D. Professor of Gynecology, Medical Department, University of Tennessee

formerly Professor of Gynecology and Abdominal Surgery, University of the South (Sewanee); Gynecologist to Nashville City Hospital; ex-President Nashville Academy of Medicine; ex-Secretary Section on Obstetrics and Diseases of Women, American Medical Association (1898); Member of American Association of Obstetricians and Gynecologists, and Alumni Association of Woman's Hospital of New York. *Treasurer*, 1900; *Secretary*, 1901–1904. 302 North Vine Street, Nashville, Tenn.

1892.—Hall, Rufus Bartlett, A.M., M.D. Professor of Clinical Gynecology in the Miami Medical College; Gynecologist to the Presbyterian Hospital; ex-President of the Cincinnati Obstetrical Society; ex-President of the American Association of Obstetricians and Gynecologists; Fellow of British Gynecological Society; Member of the American Medical Association and of the Ohio State Medical Society. 628 Elm Street, Cincinnati, O.

Founder.—*Hardon, Virgil Orvin, M.D.

1901.—Hazen, Charles M., M.D. Professor of Physiology, Medical College of Virginia. Bon Air (Richmond), Va.

1896.—Heflin, Wyatt, M.D. President of the Jefferson County Medical Society. Birmingham, Ala.

Founder.—Herff, Ferdinand, M.D. 308 East Houston Street, San Antonio, Texas.

1889.—Hill, Robert Somerville, M.D. Councillor of the Alabama State Medical Association; ex-President of the Medical and Surgical Society of Montgomery County; formerly Surgeon of Second Regiment Alabama State Troops. Montgomery, Ala.

1902.—Hirst, Barton Cooke, M.D. Professor of Obstetrics, University of Pennsylvania; Fellow of College of Physicians, Philadelphia; Gynecologist to the Howard, Orthopedic, and Philadelphia Hospitals; Fellow of American Gynecological Society. 1821 Spruce Street, Philadelphia, Pa.

Founder.—Hogan, S. M., M.D. Grand Senior Councillor and ex-Vice-President of the Medical Association of the State of Alabama. Montgomery, Ala.

1900.—Hoke, Michael, M.D., B.E. 268 Peachtree Street, Atlanta, Ga.

1891.—Holmes, J. B. S., M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee;

* Deceased.

ex-President of the Georgia Medical Association; Fellow of the American Association of Obstetricians and Gynecologists. *Vice-President*, 1894. Atlanta, Ga.

1900.—Horsley, John Shelton, M.D. Member of the American Medical Association, Richmond Academy of Medicine, and Medical Society of Virginia; Professor of Principles of Surgery, Medical College of Virginia ; Surgeon to Memorial Hospital. *Vice-President.* Richmond, Va.

1896.—Hundley, J. Mason, M.D. Associate Professor of Diseases of Women and Children, University of Maryland; President Clinical Society of Baltimore. 1009 Cathedral Street, Baltimore, Md.

1903.—Hunner, Guy Le Roy, M.D. Associate in Gynecology, Johns Hopkins University. 1420 Eutaw Place, Baltimore, Md.

1892.—*Hunter, H. M., M.D. Union Springs, Ala.

1900.—Ill, Edward Joseph, M.D. Surgeon to the Woman's Hospital; Medical Director, St. Michael's Hospital; Gynecologist and Supervising Obstetrician, St. Barnabas' Hospital; Consulting Gynecologist, German Hospital and Beth Israel Hospital of Newark, N. J.; to All Souls' Hospital, Morristown, N. J., and to Mountain Side Hospital, Montclair, N. J.; Vice-President from New Jersey to Pan-American Congress of 1893. 1002 Broad St., Newark, N. J.

1889.—Johnson, Joseph Taber, M.D. Professor of Gynecology and Abdominal Surgery, Georgetown University; formerly Gynecologist to Providence Hospital; Chief of Service of Gynecology and Abdominal Surgery, Georgetown University Hospital, and President of the Board of Administration; President of the Woman's Dispensary, and of the Medical Society of the District of Columbia (1887); Member of the British Medical Association; Fellow of the Gynecological Society; President of the Washington Obstetrical and Gynecological Society; Secretary American Gynecological Society, 1886–1890. *President*, 1899. 926 Farragut Square, Washington, D. C.

1901.—Johnson, Robert W., M.D. Professor of Surgery, Baltimore Medical College. Corner Franklin and Cathedral Streets, Baltimore, Md.

Founder.—Johnston, George Ben, M.D. Formerly Consulting Surgeon to the Richmond Eye, Ear, and Throat Infir-

* Deceased.

mary; ex-President of the Richmond Academy of Medicine and Surgery; ex-President of the Medical Society of Virginia; Member of the American Association of Obstetricians and Gynecologists, and First Vice-President, 1896; Member of the Ninth International Medical Congress; Member of the American Surgical Association; late Professor of Anatomy in the Medical College of Virginia, and now Professor of the Practice of Surgery and Clinical Surgery; Surgeon to the Old Dominion Hospital; Consulting Surgeon to the City Free Dispensary. *Vice-President*, 1892; *President*, 1897. 407 East Grace Street, Richmond, Va.

1902.—Jordan, William Mudd, M.D. Surgeon to St. Vincent's Hospital; Gynecologist to Hillman Hospital; formerly Assistant Surgeon, U. S. Marine Hospital Service. Birmingham, Ala.

1890.—Kelly, Howard Atwood, M.D. Founder of Kensington Hospital, Philadelphia; Associate Professor of Obstetrics, University of Pennsylvania, 1888–89; Professor of Gynecology and Obstetrics, Johns Hopkins University, 1888–99; Professor of Gynecology, Johns Hopkins University; Gynecologist-in-Chief to Johns Hopkins Hospital; Membre Associé Etrander de la Société Obstétricale et Gynecologique de Paris; Correspondirendes Mitglied der Gesellschaft f. Geburtshülfe zu Leipzig; Honorary Fellow Edinburgh Obstetrical Society, Royal Academy of Medicine (Ireland), and British Gynecological Society; Member Washington Academy of Sciences; Fellow American Gynecological Society. 1418 Eutaw Place, Baltimore, Md.

1899.—Kohlman, William, M.D. 3500 Prytania Street, New Orleans, La.

1897.—Laidley, L. H., M.D. Surgeon to the Protestant Hospital; Professor of Gynecology and Pelvic Surgery, Marion Sims-Beaumont Hospital Medical College; Member of the American Association of Obstetricians and Gynecologists. 3538 Washington Avenue, St. Louis, Mo.

1899.—Larue, F. A., M.D. Chief of Clinic to the Chair of Surgery, Tulane University of Louisiana; Lecturer on Operative Surgery, New Orleans Polyclinic; Visiting Surgeon to Charity Hospital. 624 Gravier Street, New Orleans, La.

1889.—Le Grand, John C., M.D. Ex-Vice-President of the American Medical Association; President of the Medical

Association of the State of Alabama. 111 North Twentieth Street, Birmingham, Ala.

1894.—Leigh, Southgate, M.D. Visiting Surgeon St. Vincent's and Norfolk Protestant Hospitals; First Vice-President Medical Society of Virginia, 1899–1900. 147 Granby Street, Norfolk, Va.

1893.—Lewis, Ernest S., M.D. Professor of Gynecology, Medical Department of Tulane University. *Vice-President*, 1895; *President*, 1896; *Member of Council*, 1896–1903. 124 Baronne Street, New Orleans, La.

1893.—Lewis, Hampton S., M.D. 124 Baronne Street, New Orleans, La.

1900.—Lloyd, Samuel, M.D. Professor of Surgery, New York Post-Graduate Medical School; Attending Surgeon, Post-Graduate Hospital, and to the Babies' Wards. 24 West Fiftieth Street, New York, N. Y.

Founder.—Long, John W., M.D. Emeritus Professor of Gynecology and Pediatrics in the Medical College of Virginia; formerly Gynecologist to the Old Dominion Hospital and the Richmond City Dispensary; Consulting Surgeon to the Watts Hospital, Durham; Member, ex-Orator, and ex-Vice-President of the North Carolina Medical Society. *Vice-President*, 1902. Greensboro, N. C.

1902.—McAdory, Wellington P., M.D. Surgeon to Hillman Hospital. Birmingham, Ala.

1895.—McGannon, M. C., M.D. Professor of Gynecology, Medical Department, University of Nashville. 301 North Spruce Street, Nashville, Tenn.

1893.—McGuire, Stewart, M.D. Professor of the Principles of Surgery and Clinical Surgery, University College of Medicine; Surgeon-in-Charge, St. Luke's Hospital; Visiting Surgeon, Virginia Hospital; Consulting Surgeon, Virginia Home for Incurables. 518 East Grace St., Richmond, Va.

1891.—McGuire, William Edward, M.D. 411 East Grace Street, Richmond, Va.

1888.—McMurtry, Lewis S., M.D. President of the American Medical Association; Professor of Gynecology and Abdominal Surgery, Hospital College of Medicine, Louisville; Gynecologist to St. Mary and St. Elizabeth Hospital; Gynecologist to Gray Street Infirmary; ex-President of the American Association of Obstetricians and Gynecologists; ex-President of the Kentucky State Medical Society; Corresponding

Member of the Gynecological Society of Boston; Fellow of the British Gynecological Society; Ordinary Fellow of the Edinburgh Obstetrical Society. *President*, 1891; *Member of Council*, 1892–1904. 1912 Sixth Street, Louisville, Ky.

1888.—McRae, Floyd Willcox, M.D. Professor of Gastro-Intestinal, Rectal, and Clinical Surgery, Atlanta College of Physicians and Surgeons; Surgeon to Grady Hospital; ex-President Medical Association of Georgia; ex-Secretary of Section on Surgery and Anatomy, American Medical Association. *Treasurer*, 1901–1903; *President*. Peters Building, Atlanta, Ga.

1900.—MacDonald, Willis G., M.D. Professor of Surgery (Adjunct), Albany Medical College; Surgeon to Albany Hospital; Chief Surgeon of South End Dispensary, etc. 29 Eagle Street, Albany, N. Y.

1900.—Manton, Walter Porter, M.D. Professor of Clinical Gynecology and Adjunct Professor of Obstetrics, Detroit College of Medicine; Gynecologist to Harper Hospital, Eastern and Northern Asylum for the Insane; Consulting Gynecologist to St. Joseph's Retreat; Vice-President of Medical Board of the Woman's Hospital and Infants' Home. 32 Adams Avenue, Detroit, Mich.

1891.—Marcy, Henry Orlando, M.D., LL.D. Ex-President of the American Medical Association; President of the Section of Gynecology, Ninth International Medical Congress; late President of the American Academy of Medicine; Corresponding Member of the Medico-Chirurgical Society of Bologna, Italy; Fellow of the American Association of Obstetricians and Gynecologists. 180 Commonwealth Avenue, Boston, Mass.

1899.—Martin, Edmund Denegre, M.D. Professor of Minor and Clinical Surgery, New Orleans Polyclinic; Visiting Surgeon to the Charity Hospital; Consulting Surgeon to the Eye, Ear, Nose, and Throat Hospital; President Orleans Parish Medical Society. 115 Chartres Street, New Orleans, La.

1899.—Mastin, William M., M.D. Fellow of the American Surgical Association; Member of the American Association of Genito-Urinary Surgeons; Surgeon to the Mobile City Hospital. Joachim and Conti Streets, Mobile, Ala.

1893.—Matas, R., M.D. Professor of Surgery, Medical Department of Tulane University; Fellow of the American Surgical Association. 624 Gravier Street, New Orleans, La.

1896.—Matthews, William P., M.D. Professor of Anatomy, Medical College of Virginia; Orthopedic Surgeon to the Old Dominion Hospital. Richmond, Va.

1902.—Mayo, Charles H., M.D. Attending Surgeon, St. Mary's Hospital. Rochester, Minn.

Founder.—Meriwether, Frank T., M.D. Assistant Surgeon, U. S. A. (Retired). Asheville, N. C.

1899.—Michinard, P. E., M.D. 624 Gravier Street, New Orleans, La.

1888.—Miller, C. Jeff., M.D. Chief of Clinic to the Chair of Diseases of Women and Obstetrics, Tulane University of Louisiana; Lecturer on Gynecology and Obstetrics in New Orleans Polyclinic; Visiting Gynecologist to Charity Hospital. 1719 Jackson Avenue, New Orleans, La.

1899.—Milliken, Samuel E., M.D. 449 Elm Street, Dallas, Texas.

1901.—Mixter, Samuel Jason, M.D. Surgeon, Massachusetts General Hospital; Consulting Surgeon, Massachusetts Charity Eye and Ear Infirmary; Instructor of Surgery, Harvard Medical School. 180 Marlborough Street, Boston, Mass.

1903.—Morgan, James B., M.D. Professor of Anatomy and Clinical Surgery, Medical College of Georgia; Chairman Board of Censors, Georgia Medical Association. 1272 Broad Street, Augusta, Ga.

1902.—Morris, Lewis C., M.D. Professor of Anatomy and Associate Professor of Gynecology, Birmingham Medical College; Councillor of Medical Association, State of Alabama; Vice-President of Tri-State Medical Society of Alabama, Georgia, and Tennessee. 716 North Eighteenth Street, Birmingham, Ala.

1900.—Morris, Robert Tuttle, M.D. Professor of Surgery, New York Post-Graduate Medical School and Hospital. 58 West Fifty-sixth Street, New York, N. Y.

1901.—Mullally, Lane, M.D. Demonstrator of Anatomy and Lecturer on Diseases of Children, Medical College State of South Carolina. Charleston, S. C.

1891.—Murfree, James Brickle, M.D. Professor of Surgery, University of the South (Sewanee); ex-President of the Tennessee State Medical Society, and of the Tri-State Medical Society of Alabama, Georgia, and Tennessee. Murfreesboro Tenn.

1894.—Murphy, J. B., M.D. Professor of Surgery, Northwestern University; Professor of Surgery, Post-Graduate School and Hospital; Attending Surgeon to Cook County and Mercy Hospitals; 100 State Street, Chicago, Ill.

Founder.—Nash, Herbert Milton, M.D. Consulting Surgeon to the Retreat for the Sick (Hospital), Norfolk; Consultant to the Staff of St. Vincent's Hospital; ex-President of the Norfolk City Medical Society; Member of the State Board of Medical Examiners of Virginia. 296 Freemason Street, Norfolk, Va.

1899.—Neff, Wallace, M.D. Formerly Adjunct Professor of Clinical Surgery and Surgical Pathology, Medical College of Ohio (University of Cincinnati); late Major and Brigade Surgeon, U. S. V. 1337 K Street, Washington, D. C.

1891.—Nelson, Hugh T., M.D. Member of the Medical Examining Board of Virginia. Charlottesville, Va.

1889.—Nicolson, William Perrin, M.D. Professor of Anatomy and Clinical Surgery, Atlanta College of Physicians and Surgeons. *Vice-President*, 1900. Prudential Building, Atlanta, Ga.

1896.—Noble, Charles P., M.D. Surgeon-in-Chief, Kensington Hospital for Women; Consulting Surgeon, Woman's Hospital; Lecturer on Gynecology, Philadelphia Polyclinic. 1500 Locust Street, Philadelphia, Pa.

1890.—Noble, George H., M.D. Ex-President of the Georgia Medical Association; ex-Secretary of Obstetrical Section of the American Medical Association. *Vice-President*, 1901. 131 South Pryor Street, Atlanta, Ga.

1903.—Nolen, William L., M.D. Visiting Surgeon, Erlanger Hospital; President Chattanooga Medical Society. Loveman Building, Chattanooga, Tenn.

1890.—Nunn, R. J., M.D. Savannah, Ga.

1902.—O'Brien, Matthew Watson, M.D. Surgeon Southern, and Chesapeake and Ohio Railways; Member of the American Association for the Advancement of Science. 908 Cameron Street, Alexandria, Va.

1901.—Ochsner, A. J., M.D. Adjunct Professor of Clinical Surgery, College of Physicians and Surgeons; Surgeon-in-Chief Augustana and St. Mary's Hospital. 710 Sedgwick Street, Chicago, Ill.

1903.—Ochsner, Edward H., M.D. Surgeon to Augustana and St. Mary's Hospital. 710 Sedgwick Street, Chicago, Ill.

1902.—Oliver, John Chadwick, M.D. Dean and Professor of Operative Surgery, Miami Medical College; Surgeon to the Cincinnati, Christ, and Presbyterian Hospitals. 628 Elm Street, Cincinnati, Ohio.

1902.—Oviatt, Charles W., M.D. Formerly Professor of Surgery in Milwaukee Medical College; Attending Surgeon St. Mary's Hospital. Oshkosh, Wis.

Founder.—Paine, John Fannin Young, M.D. Professor of Obstetrics and Gynecology in the Medical Department, University of Texas; Gynecologist and Obstetrician, John Sealy Hospital; Fellow of the American Association of Obstetricians and Gynecologists; ex-President of the Texas Medical Association; Fellow of the Texas Academy of Science. 2177 Market Street, Galveston, Texas.

1888.—Parham, F. W., M.D. Professor of Surgery in the New Orleans Polyclinic. *Vice-President*, 1899. 1429 Seventh Street, New Orleans, La.

1900.—Park, Roswell, M.D. Professor of Surgery, Medical Department, University of Buffalo; Surgeon, Buffalo General Hospital; Member German Congress of Surgeons, Italian Surgical Society, American Surgical Association, American Orthopedic, and American Genito-Urinary Associations. 510 Delaware Avenue, Buffalo, N. Y.

1893.—Parker, William E., M.D. Visiting Surgeon to the Charity Hospital. *Vice-President*, 1897. 151 Central Avenue, Hot Springs, Ark.

1899.—Perkins, W. M., M.D. Chief of the Clinic Chair of General Clinical and Operative Surgery, New Orleans Polyclinic; Assistant Demonstrator of Operative Surgery, Medical Department, Tulane University of Louisiana; Visiting Surgeon to the Charity Hospital. 205 Baronne St., New Orleans, La.

1903.—Pillow, Robert, M.D. Columbia, Tenn.

1899.—Platt, Walter Brewster, M.D. Surgeon to the Robert Garrett Hospital for Children. 802 Cathedral Street, Baltimore, Md.

1889.—Polk, William M., M.D. Dean and Professor of Obstetrics and Gynecology, Cornell University Medical College; Gynecologist to Bellevue Hospital; Consulting Surgeon to St. Luke's, St. Vincent's, New York Lying-in, and Trinity Hospitals; ex-President of American Gynecological Society, and New York Obstetrical Society. 7 East Thirty-sixth Street, New York.

1900.—Porter, Miles F., M.D. Trustee of American Medical Association. 47 West Wayne St., Fort Wayne, Ind.

1889.—Potter, William Warren, M.D. Consulting Gynecologist to the Woman's Hospital; Consulting Surgeon to the Buffalo General Hospital; President and Examiner in Obstetrics, New York State Medical Examining and Licensing Board; Chairman of Section of Obstetrics and Diseases of Women, American Medical Association, 1890; President of the Buffalo Obstetrical Society, 1884–1886; President of the Medical Society of the State of New York, 1891; Executive President of the Section of Gynecology and Abdominal Surgery, Pan-American Medical College, 1893. 284 Franklin Street, Buffalo, N. Y.

1889.—Price, Joseph, M.D. Physician-in-Charge of the Obstetrical and Gynecological Department of the Philadelphia Dispensary; Fellow of the American Association of Obstetricians and Gynecologists; ex-Chairman, Section of Diseases of Women and Obstetrics, American Medical Association. *Vice-President*, 1893. 241 North Eighteenth Street, Philadelphia, Pa.

1900.—Pryor, William Rice, M.D. Professor of Gynecology, New York Polyclinic; Consulting Gynecologist, St. Elizabeth's Hospital and to New York City Hospital; Fondateur Congress Internationale Gynecologie et d'Obstetrique; Member American Gynecological, New York Obstetrical, and New York Pathological Societies; Fellow Academy of Medicine; Member Society Alumni, Bellevue Hospital. 6 W. 84th Street, New York, N. Y.

1899.—Quinn, W. A., M.D. Henderson, Ky.

1900.—Ransohoff, Joseph, M.D., F.R.C.S. Professor of Anatomy and Clinical Surgery, Medical College of Ohio; Surgeon to Cincinnati, Good Samaritan, and Jewish Hospitals; Member American Surgical Association. 706 Walnut Street, Cincinnati, Ohio.

1890.—Reed, Charles Alfred Lee, M.D. Ex-President of the American Medical Association; Professor of Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery; Surgeon to the Cincinnati Free Hospital for Women; Fellow of the American Association of Obstetricians and Gynecologists; Fellow of the British Gynecological Society; ex-Chairman of the Section on Obstetrics and Diseases of Women of the American Medical Association; Secre-

tary-General of the Pan-American Medical Congress, 1893; Honorary Member of the Medical Society of the State of New York. Corner Seventh and Race Streets, Cincinnati, Ohio.

1900.—Rees, Charles M., M.D. Professor of Obstetrics, Charleston Medical School; Gynecologist to Shirro's Dispensary. Charleston, S. C.

1899.—Richardson, Maurice Howe, M.D. Visiting Surgeon to the Massachusetts General Hospital; Assistant Professor of Clinical Surgery, Harvard Medical School. 224 Beacon Street, Boston, Mass.

1901.—Ricketts, Edwin, M.D. Professor of Abdominal Surgery and Gynecology at the Cincinnati Polyclinic; Member of the American and British Medical Associations; Ex-President of the American Association of Obstetricians and Gynecologists. 415 Broadway, Cincinnati, Ohio.

1888.—Roberts, William O., M.D. Professor of Principles of Surgery and Clinical Surgery, Medical Department of the University of Louisville; formerly Secretary of the Surgical Section of the American Medical Association. *Vice-President*, 1889. 1520 Third Street, Louisville, Ky.

1901.—Robins, Charles Russell, M.D. Lecturer on Gynecology, Instructor in Gynecology and Abdominal Surgery, Attending Obstetrician, Outside Obstetrical Department, Medical College of Virginia; Local Surgeon, Atlantic Coast Line Railroad. 17 North Fifth Street, Richmond, Va.

1889.—Robinson, William Lovaille, M.D. Fellow of the American Association of Obstetricians and Gynecologists; ex-President of the Danville Medical Society; Member of the Medical Examining Board of Virginia; ex-President of Virginia Medical Society. *Vice-President*, 1899. 753 Main Street, Danville, Va.

1901.—Rogers, Mack, M.D. Professor of Anatomy, Birmingham Medical College. 212 Twentieth Street, Birmingham, Ala.

Founder.—Rogers, William Boddie, M.D. Professor of the Practice of Surgery and Clinical Surgery, Memphis Hospital Medical College; ex-Vice-President of the American Medical Association, and National Association of Railway Surgeons. Porter Building, Memphis, Tenn.

1901.—Rosser, Charles M., M.D. Dean, Medical Department, University of Dallas; ex-President Texas State Medical Association. *Treasurer.* Linz Building, Dallas, Texas.

1890.—Royster, Hubert A., A.B., M.D. One of the Visiting Staff of the Rex Hospital; Surgeon-in-Charge of St. Agnes' Hospital. Tucker Building, Raleigh, N. C.

1901.—Runyan, Joseph P., M.D. 203 West Second Street, Little Rock, Ark.

1893.—Saunders, Bacon, M.D. Professor of Surgery and Clinical Surgery and Dean of Faculty of Medical Department, Fort Worth University; Chief Surgeon Fort Worth and Denver City Railway; ex-President Texas State Medical Association. *Vice-President*, 1903. Ninth and Houston Streets, Fort Worth, Texas.

Founder.—Schilling, Nicholas, M.D. Cedar Bayou, Texas.

1893.—Senn, Nicholas, M.D., Ph.D., LL.D. Professor of Practice of Surgery and Clinical Surgery, Rush Medical College; Professor of the Practice of Surgery, Chicago Polyclinic; Attending Surgeon, Presbyterian Hospital; Surgeon to St. Joseph's Hospital; ex-President of the American Surgical Association and of the American Medical Association. 532 Dearborn Avenue, Chicago, Ill.

1899.—Shands, A. R., M.D. Professor of Orthopedic Surgery, Columbian University. 1328 New York Avenue, N. W., Washington, D. C.

1902.—Sherrill, J. Garland, M.D. Professor of Surgery and Clinical Surgery, Kentucky University; Consulting Surgeon to Louisville Hospital. 633 St. Charles Place, Louisville, Ky.

Founder.—Shivers, Offa Lundsford, M.D. Councillor of the Alabama Medical Association. Marion, Ala.

1893.—Simons, Manning, M.D. Professor of Clinical Surgery, Medical College, State of South Carolina; Surgeon to St. Francis Xavier's Infirmary; Surgeon to City Hospital; ex-President Medical Society of South Carolina; President of the South Carolina Medical Association; Member American Association of Obstetricians and Gynecologists; ex-Vice-President Tri-State Medical Society of Virginia and the Carolinas. *Vice-President*, 1895 and 1900; *President*, 1901. 111 Church Street, Charleston, S. C.

1900.—Simpson, Frank Farrow, M.D. Assistant Gynecologist to Mercy Hospital; Gynecologist to Out-patient Department, Mercy Hospital. 524 Pennsylvania Avenue, Pittsburg, Pa.

1894.—Smith, Reginald K., M.D. Surgeon U. S. Navy. 2600 Jackson Street, San Francisco, Cal.

1899.—Smythe, Frank Davie, M.D. Surgeon to St. Joseph's Hospital; Assistant Professor of Surgery, Memphis Hospital Medical College; Demonstrator of Operative Surgery; formerly Member of the State Board of Examiners of Mississippi. Porter Building, Memphis, Tenn.

Founder.—Souchon, Edmond, M.D. Professor of Anatomy and Clinical Surgery, Medical Department of Tulane University; Member of the American Surgical Association; President Louisiana State Board of Health. 135 Baronne Street, New Orleans, La.

Founder.—Stone, Isaac Scott, M.D. Clinical Professor Gynecology, Georgetown University; Gynecologist of Columbia Hospital; Member American and British Gynecological Societies; Honorary Fellow of Medical Society of the State of New York; Fellow of the Medical Society of Virginia; Member Washington Academy of Sciences, Washington Obstetrical and Gynecological Society, Medical Society, and Medical and Surgical Society of the District of Columbia. 1449 Rhode Island Avenue, N. W., Washington, D. C.

1894.—Talley, D. F., M.D. Ex-President Jefferson County Medical Society; Professor of Materia Medica and Lecturer on Surgery, Birmingham Medical College, Birmingham, Ala.

1902.—Tate, Magnus, A., M.D. Lecturer on Anatomy of the Female Pelvic Viscera and Embryology, Miami Medical College; Assistant Gynecologist to St. Mary's Hospital; Consulting Obstetrician to Speer's Hospital; Member American Association of Obstetricians and Gynecologists. Third and Broadway, Cincinnati, O.

Founder.—Taylor, Benjamin W., M.D. Ex-President of Columbia Medical Society and of South Carolina State Medical Association; Chief Surgeon Columbia Hospital; President of Board of Regents, South Carolina Hospital for the Insane; Consulting Surgeon South Carolina Hospital for the Insane; ex-Member of State Board of Medical Examiners. 1409 Plain Street, Columbia, S. C.

Founder.—Taylor, Hugh M., M.D. Professor of Practice of Surgery and Clinical Surgery, University College of Medicine; Surgeon to the Virginia Hospital; ex-President of the Virginia Board of Medical Examiners. 6 North Fifth Street, Richmond, Va.

1898.—Taylor, William Wood, A.B., M.D. Gynecologist to St. Joseph's and the Memphis City Hospitals. 246 Randolph Building, Memphis, Tenn.

1892.—Thompson, J. E., M.D. Professor of Surgery in the University of Texas. Galveston, Texas.

1891.—Tiffany, Louis McLane, M.D. Professor of Surgery in the University of Maryland; Fellow of the American Surgical Association. *President*, 1895. 831 Park Avenue, Baltimore, Md.

1890.—Tompkins, Christopher, M.D. Professor of Obstetrics in the Medical College of Virginia. *Vice-President*, 1903. 116 East Franklin Street, Richmond, Va.

1888.—Tuholske, Herman, M.D. Professor of Surgery, Medical Department, Washington University; Consulting Surgeon, St. Louis City Hospital; Surgeon to St. Louis Polyclinic Hospital, etc. 410 North Jefferson Street, St. Louis, Mo.

1893.—Vander Veer, Albert, M.D. Professor of Clinical, Didactic, and Abdominal Surgery, Albany Medical College; Fellow of the American Surgical Association; ex-President of the American Association of Obstetricians and Gynecologists; ex-President of the Medical Society of the State of New York. 28 Eagle Street, Albany, N. Y.

1891.—Walker, Edwin, M.D., Ph.D. Gynecologist to the Evansville City Hospital; ex-President Mississippi Valley Medical Association; President of the Indiana State Medical Society; Fellow of the American Association of Obstetricians and Gynecologists. 712 Upper Fourth Street, Evansville, Ind.

1898.—Watkins, Isaac Lafayette, M.D. President of the Montgomery County Medical and Surgical Society. Montgomery, Ala.

1901.—Werder, X. O., M.D. Gynecologist, Mercy Hospital, Pittsburg; Professor of Gynecology, West Pennsylvania Medical College; Consulting Surgeon to the South Side Hospital, Allegheny General Hospital, St. Francis' Hospital, etc. 524 Pennsylvania Avenue, Pittsburg, Pa.

1888.—Westmoreland, Willis F., M.D. Professor of Surgery, Atlanta College of Physicians and Surgeons. 241 Equitable Building, Atlanta, Ga.

1902.—Whitacre, Horace J., M.D., B.S. Professor of Pathology and Surgeon to Clinics, Medical Department

University of Cincinnati; Surgeon to Christ Hospital; Consulting Surgeon to Speer's Hospital; President Cincinnati Research Society; Assistant Pathologist Cincinnati Hospital; Surgeon to Norfolk and Western R. R. 831 Union Trust Building, Cincinnati, O.

1900.—Williams, Ennion G., M.D. 315 East Grace Street, Richmond, Va.

1900.—Williams, Howard J., A.B., A.M., M.D. Surgeon to Macon Hospital; ex-President of the Medical Association of Georgia, etc. 550 Orange Street, Macon, Ga.

1900.—Williams, J. Whitridge, A.B., M.D. Professor of Obstetrics, Johns Hopkins University; Pathologist to Woman's Hospital of Maryland. 845 Park Avenue, Baltimore, Md.

Founder.—Wilson, J. T., M.D. Ex-President of the North Texas Medical Association; President of the Texas Medical Association; Superintendent of the State Hospital for the Insane. *Vice-President*, 1891. Sherman, Texas.

1891.—Wyeth, John Allen, M.D. Ex-President of the American Medical Association (1901). Professor of Surgery in the New York Polyclinic; Consulting Surgeon to St. Elizabeth's Hospital; Visiting Surgeon to Mt. Sinai Hospital and Polyclinic Hospital; Honorary Member of the Texas State Medical Association; President of the New York State Medical Association; ex-President of the New York Pathological Society. 19 West Thirty-fifth Street, New York, N. Y.

1900.—Wysor, John C., M.D. Surgeon-in-Charge, C. & O. Hospital. Clifton Forge, Va.

1900.—Young, Hugh H., M.D. Chief of Clinic, Genito-Urinary Surgery, Johns Hopkins Hospital. 1005 North Charles Street, Baltimore, Md.

1902.—Zinke, E. Gustav, M.D. Professor of Obstetrics in Medical College of Ohio; Obstetrician and Gynecologist German Protestant Hospital; Attending Obstetrician to Ohio Maternity; Fellow of American Association of Obstetricians and Gynecologists. 13 Garfield Place, Cincinnati, O.

CONSTITUTION.

ARTICLE I.

The name of this Association shall be THE SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION.

ARTICLE II.

The object of this Association is to further the study and practice of surgery and gynecology among the profession of the Southern States.

ARTICLE III.

This Association shall adopt and conform to the Code of Ethics of the American Medical Association.

ARTICLE IV.

SECTION 1. Any reputable physician who practices surgery or gynecology, and who is vouched for by two members of the Association and recommended by the Council, shall be eligible to membership in this body.

SEC. 2. The honorary members shall not exceed ten in number, and shall enjoy all the privileges of other members, excepting to vote or hold office, but shall not be required to pay any fee.

ARTICLE V.

SECTION 1. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and a Council, elected by ballot.

SEC. 2. The President and Vice-Presidents shall be elected for one year, and the President shall not be eligible for re-election at any time; the Secretary and Treasurer, each, for five years; and the Council as provided for in the By-laws.

ARTICLE VI.

SECTION 1. It shall be the duty of the President to preside at all meetings of the Association; to give the casting vote; to see that the rules of order and decorum be properly enforced in all deliberations of the Association; to sign the approved proceedings of each meeting, and to approve such orders as may be drawn upon the Treasurer for expenditures ordered by the Association.

SEC. 2. In the absence of the President the first Vice-President shall preside, and in his absence the second Vice-President shall preside.

SEC. 3. In the absence of all three, the Association shall elect one of its members to preside *pro tem.*

SEC. 4. It shall be the duty of the Secretary to keep a true and correct record of the proceedings of the meetings; to preserve all books, papers, and articles belonging to the archives of the Association; to attest all orders drawn on the Treasurer for moneys appropriated by the Association; to keep the account of the Association with its members; to keep a register of the members, with the dates of their admission and places of residence. He shall collect all moneys due from the members and pay to the Treasurer, taking his receipt for the same. He shall report such unfinished business of previous meetings as may appear on his books requiring action, and attend to such other business as the Association may direct. He shall also supervise and conduct all the correspondence of the Association, and edit the TRANSACTIONS under the direction of the Council.

SEC. 5. It shall be the duty of the Treasurer to keep a correct record of all moneys received from the hands of the Secretary, giving his receipt for the same; pay them out by order of the Association as indorsed by the President and attested by the seal in the hands of the Secretary.

SEC. 6. It shall be the duty of the President of the Association to appoint an Auditing Committee, consisting of three members of the Association, whose duty it shall be to examine the books of the Secretary and Treasurer, and report on the same on the last day of the session.

ARTICLE VII.

Vacancies occurring in the offices of the Association shall be filled by appointment of the President until the next meeting. He shall also have the appointment of all committees not otherwise provided for.

ARTICLE VIII.

This Constitution shall take effect immediately from the time of its adoption, and shall not be amended except by a written resolution, which shall lie over one year, and receive a vote of two-thirds of the members present.

ARTICLE IX.

Any member who for three consecutive years fails to attend the meetings shall be dropped from the roll of membership.

ARTICLE X.

The membership of the Association shall be limited to two hundred.

ARTICLE XI.

All members who have been in continuous membership for twenty years and have attended fifty per cent. of the meetings shall become life members and be exempt from dues.

BY-LAWS.

ARTICLE I.

The Southern Surgical and Gynecological Association shall meet annually on the second Tuesday of November at 10 A.M., at such place as may be designated by the preceding meeting.

ARTICLE II.

The members present shall constitute a quorum for business.

ARTICLE III.

The annual dues of each member shall be $10, paid in advance.

ARTICLE IV.

The usual parliamentary rules governing deliberative bodies shall govern the business workings of this Association.

ARTICLE V.

All questions before the Association shall be determined by a majority of the votes present.

ARTICLE VI.

The President shall deliver an annual address at each meeting of the Association.

ARTICLE VII.

The Secretary of the Association shall receive, at each annual Session, a draft from the President, drawn on the Treasurer, for the sum of $500 for services rendered the Association, and to this shall be added the necessary expense incurred in the discharge of his official duties.

ARTICLE VIII.

It shall be the duty of the Secretary, one month prior to the annual meeting, to notify the members of the Association, and urge their attendance.

ARTICLE IX.

The authors of papers shall notify the Secretary, six weeks prior to the meeting, of the titles of their essays, so that they may be incorporated in the preliminary programme.

ARTICLE X.

COUNCIL.

The Council shall consist of five members; and of those elected at the primary meeting, the first shall serve five years, the second four, the third three, the fourth two, and the fifth one year; so that subsequently one member of the Council shall be elected annually to serve five years. The President and Secretary shall be *ex-officio* members of the Council.

This Council shall organize by electing a Chairman and Secretary, and shall keep a record of its proceedings.

The duties of this Council shall be—

1. To investigate applications for membership and report to the Association the names of such persons as are deemed worthy.

2. To take cognizance of all questions of an ethical, judicial, or personal nature, and upon these the decision of the Council shall be final; *provided*, that appeal may be taken from such decision of the Council to the Association, under a written protest, which protest shall be sustained by the Association, and the matter shall then be referred to a special committee, with power to take final action.

3. All motions and resolutions before the Association shall be referred to the Council without debate, and it shall report by recommendation at as early an hour as possible.

ARTICLE XI.

The President shall appoint at each annual meeting a Committee of Arrangements.

ARTICLE XII.

The Council shall have full power to omit from the published TRANSACTIONS, in part or in whole, any paper that may be referred to it by the Association, unless specially instructed to the contrary by the Association, which will be determined by vote.

ARTICLE XIII.

Any member failing to pay his dues for more than one year shall be dropped.

ARTICLE XIV.

No paper shall be read before this Association which does not deal strictly with a subject of surgical or gynecological importance.

ARTICLE XV.

No paper read before the Association shall be published in any medical journal or pamphlet for circulation, as having been read before the Association, without having received the indorsement of the Council.

ARTICLE XVI.

The reading of papers shall be limited to twenty minutes each, except by permission of the Association.

MINUTES OF THE PROCEEDINGS

AT THE

SIXTEENTH ANNUAL MEETING

OF

THE SOUTHERN

SURGICAL AND GYNECOLOGICAL

ASSOCIATION,

HELD AT THE

PIEDMONT HOTEL,

Atlanta, Georgia,

DECEMBER 15, 16 AND 17, 1903.

SIXTEENTH ANNUAL MEETING.

FIRST DAY.—*Tuesday, December* 15, 1903.

The following named members were present:

BALDY, JOHN M.	Philadelphia, Pa.
BENEDICT, SAMUEL C.	Athens, Ga.
BONIFIELD, CHARLES L.	Cincinnati, O.
BOSHER, LEWIS C.	Richmond, Va.
BOVEE, J. W.	Washington, D. C.
BROOME, G. W.	St. Louis, Mo.
BROWN, GEORGE S.	Birmingham, Ala.
BYFORD, HENRY T.	Chicago, Ill.
COLEY, ANDREW J.	Alexander City, Ala.
COLEY, WILLIAM B.	New York, N. Y.
CRILE, GEORGE W.	Cleveland, O.
CROFFORD, T. J.	Memphis, Tenn.
DAVIS, JOHN D. S.	Birmingham, Ala.
DEAN, G. R.	Spartanburg, S. C.
DOUGHTY, W. H.	Augusta, Ga.
DOUGLAS, RICHARD	Nashville, Tenn.
EARNEST, J. G.	Atlanta, Ga.
ELKIN, WILLIAM S.	Atlanta, Ga.
ELLIS, JAMES N.	Atlanta, Ga.
FREIBERG, ALBERT H.	Cincinnati, O.
GASTON, J. McF.	Atlanta, Ga.
GOGGANS, JAMES A.	Alexander City, Ala
GOLDSMITH, W. S.	Atlanta, Ga.
HAGGARD, WILLIAM D.	Nashville, Tenn.
HARDON, VIRGIL O.	Atlanta, Ga.
HIRST, BARTON C.	Philadelphia, Pa.
HOKE, MICHAEL	Atlanta, Ga.
HOLMES, J. B. S.	Atlanta, Ga.
HORSLEY, J. SHELTON	El Paso, Texas.
JOHNSTON, GEORGE BEN.	Richmond, Va.

JORDAN, WILLIAM M.....Birmingham, Ala.
KIME, RUFUS R.....Atlanta, Ga.
LE GRAND, JOHN C.....Birmingham, Ala.
MCGANNON, M. C.....Nashville, Tenn.
MCGUIRE, STUART, ...Richmond, Va.
MCREA, FLOYD W.....Atlanta, Ga.
MAYO, CHARLES H. .....Rochester, Minn.
MORRIS, LEWIS C. .....Birmingham, Ala.
NICOLSON, WILLIAM P. .....Atlanta, Ga.
NOBLE, GEORGE H. .....Atlanta, Ga.
O'BRIEN, MATTHEW W. .....Alexandria, Va.
OVIATT, CHARLES W.....Oshkosh, Wis.
RICHARDSON, M. H.....Boston, Mass.
ROBERTS, WILLIAM O.....Louisville, Ky.
ROBINS, CHARLES R.....Richmond, Va.
ROBINSON, WILLIAM L.....Danville, Va.
ROGERS MACK .....Birmingham, Ala.
ROGERS, WILLIAM B. .....Memphis, Tenn.
ROSSER, CHARLES M.....Dallas, Texas.
ROYSTER, HUBERT A.....Raleigh, N. C.
SAUNDERS, BACON .....Fort Worth, Texas.
SHANDS, A. R.....Washington, D. C.
SHERRILL, GARLAND .....Louisville, Ky.
SHIVERS, LUNDSFORD OFFA .....Marion, Ala.
SIMPSON, FRANK FARROW.....Pittsburg, Pa.
STONE, ISAAC SCOTT.....Washington, D. C.
TALLEY, D. F.....Birmingham, Ala.
TOMPKINS, CHRISTOPHER .....Richmond, Va.
WESTMORELAND, WILLIS F.....Atlanta, Ga.
WHITACRE, HORACE J.....Cincinnati, O.

NEW MEMBERS PRESENT.

BALLOCH, EDWARD O.....Washington, D. C.
CARR, W. P.....Washington, D. C.
GOFFE, J. RIDDLE.....New York, N. Y.
HUNNER, GUY L. .....Baltimore, Md.
PILLOW, ROBERT .....Columbia, Tenn.

Morning Session.—The Association convened at the Piedmont Hotel, at 10 A.M., and was called to order by the President, Dr. J. Wesley Bovée, of Washington, D. C.

Dr. Willis F. Westmoreland, Chairman of the Local Committee of Arrangements, introduced Hon. Evan P. Howell, Mayor of Atlanta, who delivered the following

ADDRESS OF WELCOME.

Mr. President and Gentlemen of the Southern Surgical and Gynecological Association: It affords me great pleasure to welcome you to the city of Atlanta. I am delighted to welcome you to this city both on account of your standing and your profession, and because I know you will be in the hands of the best people in Atlanta. Your professional brethren here are highly respected. This cannot always be said in every community of doctors. I know that you cannot fall into any better hands than those of your brethren who are present. Whatever is necessary for your comfort and happiness and pleasure the city of Atlanta will furnish you. If we fall short in any particular, it will be an error of the head and not of the heart. I welcome you because you are recognized as one of the grandest and greatest professions in the United States. It is true sometimes we hear criticisms of doctors when they fail, and sometimes they do fail. However, I have a very high regard for the medical profession, because my wife is the daughter of a doctor, and she has never been arbitrary in but two things, and one was religion and the other was medicine. She has never had confidence enough in me to allow me to prescribe when the children were sick, which I thought was rather arbitrary, but I must say she has been successful in it. We have raised seven and never lost one, through the mercy of God and the doctors. (Laughter.)

The members of the medical profession, whether among civilized human beings or among savages, stand high. Nobody can excel the medicine man among the Indians. Even the Chief has to give way to him. And that is the case also in civilization. I do not care how arbitrary the ruler is, whether he will obey the law or not, when the doctor lays down the law to him and his life is at stake, he obeys the doctor.

If there is anything in this city that you would care to have, it matters not what it is, you are welcome to it. There are no keys to the city of Atlanta. Mr. Sherman took the keys some years ago and forgot to return them. We ask you to help your-

selves, and if any of you should get into trouble during your sojourn here all you have to do is to let me know, and I will be on hand to help you out of it. We have here not only a healthy city, but healthy doctors. They are all doing well. I don't know whether they are making much money or not, but they seem to keep up with the procession. I commend you to the brethren of your profession, and whatever they lack in entertainment help yourselves, and I will take care of the remainder. (Applause.)

At this juncture the Rev. Mr. Bradley, of Atlanta, arrived, and was called upon to invoke Divine blessings on the convention, after which the President called upon Dr. George Ben Johnston, of Richmond, Virginia, to respond to the Address of Welcome.

RESPONSE TO THE ADDRESS OF WELCOME, BY DR. JOHNSTON.

Mayor Howell, Mr. President, and Gentlemen: This is a very unexpected honor and privilege, but I think it might easily have been bestowed upon a worthier member. I am not skilled in speech making, and I am very much embarrassed to execute your command. We all know Atlanta, the flower of Southern cities. We have all known of the hospitality which is so freely and generously dispensed here, because on more than one occasion we have been the recipients of Atlanta's hospitality. We likewise need not have been told by the Honorable Mayor that the physicians of Atlanta are among the best citizens. We appreciate most cordially and thoroughly the hospitality which the Mayor has so generously offered us, and I dare say certain members of the Association have felt some sense of relief at his announcement that there are no keys to the city of Atlanta, because as long as some of our members are away from home they might feel disposed to disport themselves in this gay city, and knowing they are going to have immunity from the law it will be some relief to their feelings. However, I feel, Mr. Mayor, that these gentlemen will conduct themselves in a becoming manner and not impose upon the generous offer that you have made them. We feel extremely grateful for the tender of hospitality which we knew in advance we would receive, and I am confident that all of the good things that are put down for us will be abundantly appreciated. (Applause.)

REPORT OF THE COMMITTEE OF ARRANGEMENTS.

Dr. Westmoreland, Chairman of the Local Committee of Arrangements, said that on Tuesday evening at nine o'clock there would be a reception at the Capital City Club tendered by the Atlanta members. Entertainment would be provided also for the visiting ladies.

On motion, the report of the Committee of Arrangements was adopted.

Papers were then read as follows:

1. "A Study of the Prostate and Treatment of Obstructive Hypertrophy," by Dr. G. Wiley Broome, St. Louis, Mo.

Discussed by Drs. Mayo, Carr, and the discussion closed by the essayist.

2. (*a*) "Œdematous Encephalitis: A Study of the Conditions Found in Operating for Cerebral Epilepsy and Allied Conditions; (*b*) A New Device and Method for Intestinal Anastomosis," by Dr. W. P. Carr, Washington, D. C.

Discussed by Drs. Mayo, Robinson, Stone, Hunner, Sherrill, Chavigny, and the discussion closed by the essayist.

3. "Fracture-dislocation of the Spine," by Dr. J. Shelton Horsley, Richmond, Va.

Discussed by Drs. Roberts, Balloch, Richardson, Coley, Baldy, Robinson, and the discussion closed by the essayist.

4. "The Surgical Physiology of the Lymphatic System," by Dr. C. H. Mayo, Rochester, Minn.

Discussed by Drs. Oviatt, McRae, and in closing by the essayist.

On motion of Dr. Haggard, the Association adjourned until 2.15 P.M.

Afternoon Session.—The Association reassembled at 3 P.M., and was called to order by the President.

5. "Neoplasms, Wherever Situated, Should, if Possible, be Removed, Whatever Their Apparent Nature," by Dr. Maurice H. Richardson, Boston, Mass.

Discussed by Drs. Byford, Nicolson, Coley, Carr, Baldy, Shivers, Horsley, and the discussion closed briefly by the essayist.

The President appointed as members of the Council *pro tem.* Drs. W. O. Roberts, V. O. Hardon, I. S. Stone and Richard Douglas.

6. "Intestinal Cancer," by Dr. J. Garland Sherrill, Louisville, Ky.

Discussed by Drs. Stone, Mayo, Coley, Richardson, McRae, and the discussion closed by the essayist.

7. "Early Diagnosis of Cancer of the Uterus," by Dr. F. F. Simpson, Pittsburg, Pa.

Discussed by Drs. Byford, Hardon, Baldy, Rosser, and the discussion closed by the essayist.

8. "Seven Cases of Amputation of the Hip-joint for Sarcoma, without Immediate Mortality," by Dr. W. B. Coley, New York, N. Y.

Discussed by Drs. Robinson, Richardson, Roberts, and the discussion closed by Dr. Coley.

9. "Gallstones," by Dr. Mack Rogers, Birmingham, Alabama.

Discussed by Drs. Richardson, Sherrill, Stone, Chavigny, Mayo, and the discussion closed by the essayist.

On motion, the Association then adjourned until Wednesday morning.

SECOND DAY.—*Wednesday, December* 16, 1903.

Morning Session.—The Association met at 9.30 A.M., and was called to order by the President.

10. "The Recognition and Treatment of Congenital Misplacements of the Hip in Infancy," by Dr. A. H. Freiberg, Cincinnati, Ohio.

Discussed by Drs. Shands and Freiberg.

11. "Spurious Dysmenorrhœa," by Dr. Henry T. Byford, Chicago, Ill.

Discussed by Drs. Shivers, Rosser, Royster, McGannon, Robinson, and the discussion closed by the essayist.

12. "The Surgery of Urinary Tuberculosis in Women," by Dr. Guy L. Hunner, Baltimore, Md.

Discussed by Drs. Douglas, Richardson, Balloch, McGuire, and, in closing, by the essayist.

The President appointed as an Auditing Committee Drs. John D. S. Davis, J. Shelton Horsley and J. B. S. Holmes.

13. "A Case of True Virginal Hypertrophy of the Mammæ," by Dr. George Ben Johnston, Richmond, Va.

Discussed by Drs. Richardson and Byford.

Dr. Horsley reported on behalf of the Auditing Committee that the committee had examined the books of the Secretary

and Treasurer and had found them correct, with cash on hand, $3425.95.

On motion, the report was accepted and adopted.

14. "Memorial Address on Dr. W. E. B. Davis," by Dr. Richard Douglas, Nashville, Tenn.

At the conclusion of the Memorial Address, Dr. Charles M. Rosser, Dallas, Texas, spoke as follows:

As I have listened to the impressive and impassioned words of the orator, a thought fixed itself upon my mind, and I trust that I commit no impropriety in thus bringing a simple tribute to the memory of our lamented friend from those of the great Southwest, who, though divided by distance, stand with you in this hour of sadness and regret. Perhaps no one and no class of men more keenly appreciate the limitations of their own powers than do physicians, standing as they do continually in the presence of disease and death. And if we have seen the sinless babe fade like a flower from a mother's breast; have seen the youthful eye recalled from the horizon of hope; if we have been distressed and agonized when strong men have gone down upon the battlefield mid waving plumes, with the shouts of victory upon their lips; if a sickening sorrow has been ours when the old man, weary under the weight of years, has calmly laid down to say good-by, what shall we say in this presence, having seen the purity of the babe, the enthusiasm of the youth, the courage of the warrior, and the wisdom of a sage, all depart by one fell stroke of the dread destroyer?

> "Leaves have their time to fall,
> And flowers to wither at the north wind's breath,
> And stars to set—but all,
> Thou hast all seasons for thine own, O death."

And, my friends, if what the orator has said of the great obligation we owe to our distinguished and departed friend be true—and these truths find ready responses in the hearts of all—it is not merely the words of an hour or the sentiments of a passing day which alone are appropriate now, for the lifework of so noble a brother should not soon pass from the memories of men. I believe it to be our duty and an honor which we may well bring to ourselves that we place in the city of Birmingham, upon a site to be selected by the family and friends of Dr. Davis, a monument to his merit and an enduring testimonial

of our affectionate regard. I make this suggestion as it has occurred to me, and without consultation, and trust that the Association may adopt such measures as will most appropriately put its purpose into operation and effect.

In accordance with the suggestions contained in the remarks of Dr. Rosser, a resolution was adopted concerning the erection of a monument to Dr. Davis.

Dr. O. L. Shivers, Marion, Alabama, referred feelingly to his acquaintance with and the work of Dr. Davis. He said:

Mr. President: After listening to the address of Dr. Douglas on the life and labors of Dr. W. E. B. Davis, I feel that I would be recreant, not simply to the friendship I have for him, but to that profound love I have always had for him, if I did not offer to this Association some manifestation of my feelings toward him as a man, brother, and benefactor of the human family. He was one of nature's noblemen. His deeds of generosity were not bounded by conditions or circumstances of life. His heart was big enough to take in the whole world, and he did it, for there was not a part of the civilized globe where medicine was known but his name was known and loved for the good he had done. To know him was but to love him, for no sunnier, sweeter nature was ever given by the Supreme Ruler of the universe to soothe the sorrows of the afflicted and encourage the hearts of those bowed down in grief.

When I think of those December days in 1886 when a limited number of the physicians and surgeons of Alabama met in Birmingham and organized the "Alabama Surgical and Gynecological Association," and I gaze around upon this sea of upturned faces, but one greets my vision who was present on that occasion as a co-worker and co-laborer in the foundation of this the most prominent and successful scientific association in America.

"The tear of regret will instinctively swell" when I wonder what good the life of a man like that of Dr. Davis would have accomplished had he been allowed to live out the number of his days.

> "The good die first,
> And they whose souls are dry as summer's dust
> Burn to the socket."

Some of those who were with Dr. Davis and myself have gone to distant lands, and some "in the church-yard lie."

Looking backward and seeing but one of the faces of 1886,

> "I feel like one who treads alone
> Some banquet-hall deserted."

He was

> "Born to nurse,
> And to soothe and to solace, to help and to heal
> The sick world that leaned on him."
> "No life can be pure in its purpose and strong in its strife,
> And all life not be purer and stronger thereby."

Dr. Christopher Tompkins, Richmond, Va., at this juncture took the chair, and President Bovée delivered the Presidential Address, after which, on motion, the Association adjourned until 2.30 P.M.

Afternoon Session.—The Association reassembled at 3 P.M., and was called to order by the First Vice-President, Dr. Tompkins.

15. "Pus Collections in the Pelvis," by Dr. C. N. Chavigny, of New Orleans, La.

16. "Technique of Operations by the Vaginal Method," by Dr. J. Riddle Goffe, of New York, N. Y.

These two papers were discussed jointly by Drs. Byford, McGannon, Dean, Hunner, Holmes, Baldy, and the discussion closed by the essayists.

17. "Tubercular Ostitis of the Knee-joint, with Exhibition of Plaster-of-Paris Bandage," by Dr. A. R. Shands, of Washington, D. C.

Discussed by Drs. Carr, Nicolson, Oviatt, Brown, Sherrill, Rosser, and the discussion closed by the essayist.

18. "Excision of the Psoas Magnus Muscle for Sarcoma," by Dr. George H. Noble, of Atlanta, Ga.

19. "The Differential Diagnosis of Lupus, Cancer, Syphilis, and Rodent Ulcer of the Vulva," by Dr. Barton Cooke Hirst, of Philadelphia, Pa.

Discussed by Drs. Dean, Royster, and, in closing, by Dr. Hirst.

On motion, the Association adjourned until Thursday at 9.30 A.M.

THIRD DAY.—*Thursday, December* 17, 1903.

Morning Session.—The Association met at 9.30 A.M., and was called to order by the President.

This session opened with a symposium on appendicitis, papers being read as follows:

20. "Appendicitis," by Dr. George R. Dean, of Spartanburg, S. C.

21. "Association of Appendicitis and its Relation to Pelvic Inflammatory Troubles," by Dr. J. M. Baldy, of Philadelphia, Pa.

22. "Post-peritoneal Infection following Appendicitis," by Dr. I. S. Stone, of Washington, D. C.

23. "Notes on the Short Incision in Appendicitis," by Dr. Robert T. Morris, of New York, N. Y.

24. "The Significance and Management of Paralysis of the Bowel," by Dr. George S. Brown, of Birmingham, Alabama.

The symposium was discussed by Drs. Robinson, Mayo, Carr, Haggard, Crile, Byford, Hardon, McGannon, Bonifield, Royster, Persons, and the discussion closed by the essayists.

25. "Septic Thrombosis of the Femoral Vein following Influenza," by Dr. D. F. Talley, of Birmingham, Alabama.

Discussed by Dr. Brown, and the discussion closed by the essayist.

26. "Five Recent Successful Laparotomies for Gunshot Wounds of the Abdominal Viscera, Including One with Twenty-eight Perforations of the Intestine and Mesentery," by Dr. Robert W. Johnson, of Baltimore, Md.

27. "Cases of Intestinal Resection," by Dr. Wm. H. Doughty, Jr., of Augusta, Ga.

Discussed by Drs. Talley, Mayo, Royster, Crile, and the discussion closed by the essayists.

The Secretary presented the following report of the Council:

REPORT OF THE COUNCIL.

The Council recommends:

1. That the custom of having an annual dinner, to be paid for by each individual, be established, and that such dinner constitute the only entertainment of the Association.

2. That it would be inexpedient for the Association to meet in Dallas at this time, and that the hospitable and sincere invitation so cordially tendered by Dr. Rosser and others to hold its next session there be regretfully declined.

3. That Birmingham, Alabama, be chosen as the next place of meeting.

4. That the meeting occur on Tuesday, Wednesday, and Thursday, December 13, 14, and 15, 1904, and that Dr. John D. S. Davis be selected as the Chairman of the Committee of Arrangements.

5. That the former action of the Association in appropriating $2000 to a memorial in Birmingham, consisting of a ward bearing the name of the Association, in the City Hospital of Birmingham, be rescinded, and that in lieu thereof $2000 be appropriated for the erection of a monument to the memory of Dr. W. E. B. Davis in that city as a most fitting memorial possible from this Association, and that Dr. Richard Douglas and the Secretary be appointed a committee to arrange for the erection of the monument; that the Treasurer is hereby authorized to pay over the sum of $2000 upon proper requisition of the committee, and that, if possible, the monument be unveiled at the next meeting of the Association, with appropriate ceremonies.

6. That Dr. V. O. Hardon, of Atlanta, Ga., be requested to prepare a suitable memorial sketch of the late lamented Dr. James McFadden Gaston, of Atlanta, for publication in the TRANSACTIONS, and that Dr. L. S. McMurtry be requested to prepare a similar sketch of the life and work of the third President, Dr. George J. Engelmann.

7. That the resignation of Dr. Robert Williams, of Richmond, be regretfully accepted.

8. That the following gentlemen are eligible and are nominated for Fellowship:

Dr. James B. Morgan, Augusta, Ga.
Dr. W. L. Nolen, Chattanooga, Tenn.
Dr. James A. Gale, Roanoke, Va.
Dr. Robert Pillow, Columbia, Tenn.
Dr. Edward A. Balloch, Washington, D. C.
Dr. W. P. Carr, Washington, D. C.
Dr. A. J. Downes, Philadelphia, Pa.
Dr. J. Riddle Goffe, New York, N. Y.
Dr. Guy L. Hunner, Baltimore, Md.
Dr. Edward H. Ochsner, Chicago, Ill.

That several applications are incomplete and will lie over.

The Council announces that seven Fellowships have been forfeited for non-payment of dues.

9. That the following named are nominated for the various offices:

For President, Dr. Floyd W. McRae, of Atlanta, Ga.; for First Vice-President, Dr. George S. Brown, of Birmingham, Alabama; for Second Vice-President, Dr. J. Shelton Horsley of Richmond, Va.; for Treasurer, Dr. Charles M. Rosser, of Dallas, Texas, to fill out the unexpired term of two years of the former Treasurer; for Secretary, the present incumbent.

10. That the unexpired term on the Council of Dr. W. E. B. Davis be filled by Dr. J. Wesley Bovée; that the vacancy caused by the expiration of service of Dr. E. S. Lewis be filled by Dr. Richard Douglas.

11. That at the request of the Secretary and the Treasurer, these officers be bonded in some fidelity company in the sum of $2500 each, and that the premiums be paid out of the funds of the Association.

GEORGE BEN JOHNSTON,
J. WESLEY BOVEE,
W. O. ROBERTS,
RICHARD DOUGLAS,
I. S. STONE,
W. D. HAGGARD,
V. O. HARDON.

On motion of Dr. W. L. Robinson, the report of the Council was adopted.

At this juncture the President appointed Drs. Hardon and Haggard to escort the President-elect to the chair.

President Bovée, in introducing his successor, said: Although I do not doubt the wisdom of the members of the Association in electing me President last year, I believe the precedent of electing the Vice-President to the presidential chair seems to be against the better judgment of the Association. However, these tokens of personal consideration I very highly appreciate. This year you have selected two members for Vice-Presidents who have been very efficient and of great assistance to me in conducting my duties. This has also been much appreciated, and I thank these gentlemen for what they have done. The honor of being President of this Association is one any man in professional life engaged in the line of work we are doing should feel proud of and highly appreciate. I am sure he cannot help feeling the honor, and I must confess that I am really overcome by the honor you have conferred upon me. It gives me great pleasure to turn over the gavel to Dr. McRae, and to tell you

that I shall always have the deepest respect for this Association, and I hope that none of the interest I have shown in the past will be lessened in the future. (Applause.)

Dr. McRae, in accepting the Presidency, said: Gentlemen, it would be untruthful for me to say I did not feel this honor more deeply than anything that has ever come to me, and if I were to say that I did not appreciate it as the greatest compliment that could be paid to me. I appreciate it more than anything that could have been given to me, and I assure you, gentlemen, I realize fully its great importance. I realize that I cannot measure up to the standard of the distinguished men who have occupied this office and wielded this gavel before me. I can promise, however, that I will give, during the next year, the very best work there is in me, first, last, and all the time, with an eye single to the success of this Association, national in scope, universal in its humanity, and only Southern in its place of meeting. (Applause.)

On motion, the Association adjourned until 2.30 P.M.

Afternoon Session.—The Association reassembled at 2.30 P.M., and was called to order by the President.

28. "Free Growths in the Tunica Vaginalis," by Dr. E. A. Balloch, of Washington, D. C.

Discussed by Drs. Robinson, Byford, Whitacre, and the discussion closed by the essayist.

29. "Extrauterine Gestation," by Dr. T. J. Crofford, of Memphis, Tenn.

Discussed by Drs. Byford, Hunner, Stone, Shivers, Haggard, Doughty, McGannon, and the discussion closed by the essayist.

30. "Resuscitation of the Apparently Dead, and Demonstration of a Rubber Pneumatic Suit as a Means of Controlling Blood Pressure," by Dr. George W. Crile, of Cleveland, Ohio.

Discussed by Dr. Robinson, Dean, Shivers, and the discussion closed by the essayist.

31. "Case of Carcinoma of the Rectum, with Excision by the Combined Perineal and Abdominal Route," by Dr. Horace J. Whitacre, of Cincinnati, Ohio.

Discussed by Drs. Robinson, Balloch, Shivers, and the discussion closed by the essayist.

32. "Complications to be Met with in the Surgical Treatment of the Testicle," by Dr. J. McFadden Gaston, Jr., of Atlanta, Ga.

Discussed by Drs. Dean, Shivers, Carr, Johnson, and the discussion closed by Dr. Gaston.

Dr. W. L. Robinson, of Danville, Va., said: Before we adjourn, Mr. President, I wish to extend, on behalf of the Association, a vote of thanks to Dr. Westmoreland, Chairman of the Local Committee of Arrangements, and his associates; to the clubs who have entertained us; to the Mayor and citizens of Atlanta for the magnificent entertainment which we have enjoyed, and to the Piedmont Hotel for accommodations.

The resolution was seconded by several and unanimously carried by a rising vote.

There being no further business to come before the meeting, the Association, on motion, then adjourned to meet in Birmingham, Alabama, December 13, 14 and 15, 1904.

W. D. HAGGARD, M.D.,
Secretary.

The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

W. D. HAGGARD, M.D., *Secretary*,
NASHVILLE, TENN.

ANNUAL ADDRESS OF THE PRESIDENT.

THE PROGRESS OF URETERAL SURGERY.

By J. Wesley Bovée, M.D.,
Washington, D. C.

Fellow-members: Since our last meeting we have suffered the loss by death of three of our Ex-Presidents: our beloved W. E. B. Davis, who was our President at the last meeting; George J. Engelmann, President in 1890, and J. McFadden Gaston, President in 1892. We will miss them very much from our scientific and social concourses. It was impossible for such men to have mingled in any body of surgeons without leaving an indelible imprint that carries with its termination a marked sense of loss. Time may lessen, but cannot efface it.

Custom has it that with the honor you have conferred upon me this year comes a duty that has caused me no little embarrassment. I have found great difficulty in selecting a subject upon which to address you, and still greater that of believing myself competent to prepare such an address as would seem proper. These, gentlemen, are evidences of my sincere regard for the membership and high scientific position of this Association.

I will ask your indulgence to-day while I briefly consider, as one must in a paper of this scope, some features of a comparatively new and a deeply interesting work—that of surgery of the ureter. I will speak of its history and its

present status, adding a few suggestions as to its unsolved problems, and trusting I will not overtax your patience.

Down to 1830 but little had been done in surgery of the ureter and kidney. Simon, in 1851, had, by a process of necrosis, caused bilateral ureterorectal anastomosis for ectopic bladder, and Smith, in 1878, had made bilateral ureterocolonic anastomosis, but his patient, like Simon's, died. The profession, however, was anxious and expectant.

Lemaire, in 1861, had been employing carbolic acid in the treatment of wounds and other conditions. Jameson, of Baltimore, had, in 1827, recommended buried animal ligature in surgical operations, and Lister had been preaching and practising the same for twelve or thirteen years, and employing the carbolic acid, which had such ambitious exponents as Lemaire and Declat. For a shorter period Lister had been spraying the operating-room, patient, operator, and assistants. To quote Pilcher: "It was the time when spray machines were most numerous, and when their odoriferous, melano-uriniferous clouds enveloped every wound and befogged every dressing. In the temple of Æsculapius the incense of carbolic acid was continually arising, nor as yet had even a faint tinge of the odor of iodoform began to be mixed with it. Mackintosh protective and the eight layers of carbolated resinous gauze, carbolated catgut, and drainage tubing, and 1: 40 carbolic solution, these constituted the ordnance through which surgical victories were to be won." The value of antiseptic practice has been proven beyond the possibility of question, but the theory of germ infection, upon which it was based, had not yet been fully demonstrated. Even so late as December, 1879, in a debate in which many of the leading surgeons of London participated, Mr. Timothy Holmes was able to say that "no convincing proof of the germ theory as applied to living tissue and living phenomena has as far as I know yet been offered. It was not until 1881 that the observations of Ogston on the relations of micro-organisms to surgical diseases were published, and not until the publi-

cation of Rosenbach, in 1884, and of Passet, in 1885, were the varieties and natural history of the common micro-organisms of suppuration fully described and their identity established. These had to be preceded by the epoch-making researches of Koch on staining methods and culture media, and it was not until 1881 that his treatise *Zur Uretersuchung von pathegenen Organismen* was published. Necessarily surgery was quite primitive, though some surgeons were doing a large number of major operations. In 1879 Macewen did his first radical cure of non-strangulated hernia, and in 1871 and 1878 Marcy published his method of herniotomy. Again, in 1880, at the Seventh International Medical Congress, which Bassini attended, he dwelt at length upon his operation, practically that known at present as the Bassini. It was not until March, 1888, that Bassini reported to the Congress of Italian Surgeons his first one hundred cases. This report, however, was evidently the incentive to the surgical world to attempt radical cure of hernia. Various surgeons were operating on appendical abscesses without even suspecting the role of the appendix in the formation of them. It was not until 1886 that Fitz, of Boston, published his paper entitled "Perforating Inflammation of the Vermiform Appendix, with Special Reference to its Early Diagnosis and Treatment." About this time Morton removed the appendix after mature deliberation. This was probably the first appendectomy operation of the kind. In 1879 Tait removed a pyosalpinx for the first time, as well as doing his first cholecystotomy. His first operation for primary ruptured tubal pregnancy was done at about the same time. Kimball, Dunlop, Peaslee, Thomas, Thornton, and Spencer Wells at this time were doing a large amount of work in ovariotomy for such large ovarian cysts as are rarely met with at present. Sir Spencer Wells, in 1858, and Keith, in 1862, began their work in this line, and in the course of fifteen years thousands of ovariotomies had been done. It was probably the work of these abdominal surgeons that led up to surgery of the ureter

and kidney. Little work had been done on these structures. It is probably true that in 1670 Zambeccarius—and two years later Roonhuysen—had proved by experiments on animals that under the best circumstances one kidney could perform the function of elimination of urine satisfactorily after its fellow had been extirpated. Laffitte published in 1759 three cases of calculous pyonephrosis upon which he had operated in 1727, 1734, and 1741. The operation consisted in incising the abscess, which was pointing at the surface, and allowing the pus and calculi to escape. The consensus of opinion at that time, as recorded by him, Hevin, and some other contemporary writers, was that "cutting" for stone in the kidney was not justifiable except when an abscess was pressing for evacuation at the surface of the body, "blazing the way," to employ a common expression of to-day. It is also probable that in 1815 Hennon treated a penetrating wound of the ureter in the soldier Labiehe of Napoleon's army, and that in 1848, during the revolution of that year, the Archbishop of Paris was the victim of a similar injury, both of which were gunshot wounds. It is not positively proven that the case tapped six times by Stanley in 1844 was of this nature, but presumably it was. Numerous vaginal operations had been done for ureterovaginal fistula in this country by Parvin, Emmet, and others, and by Duclout and others in Europe, without much success. The case of the English Consul Hobson, at Venice in the eighteenth century, and that of the free archer of Bagnolet (1819) were said to have been successful nephrolithotomies. Their authenticity has never been established, and being probably similar to Laffitte's cases they apparently had no effect upon surgery of the kidney. In 1856 Gigon recommended opening the ureter through the loin to remove calculi from it, and proposed as a name for the operation the word "ureterotemnie." He did not perform the operation, however. The first recorded nephrectomy was done by Wolcott, of Milwaukee, June 4, 1861. The operation was done upon the diagnosis of cyst

of the liver, but the condition proved to be encephaloid cancer of the kidney. The man lived fifteen days, dying, according to Stoddard, who assisted Wolcott, of exhaustion, apparently caused by the great amount of suppuration which necessarily followed the operation. In 1867 Spiegelberg had a fatal nephrectomy done for hydatid renal cyst, diagnosed as cyst of the ovary. The removal was incomplete. In 1868 Peaslee removed a supposed solid ovarian tumor and found it to be a renal tumor. This patient died. About this time Spencer Wells removed a kidney with an ovarian tumor, and later discovered the error. These two patients died from conditions in no way associated with impaired kidney function.

It remained for Simon to plan and perform the first nephrectomy. Margarette Kleb had had an ovarian cyst and her uterus removed in 1867 by Walther, of Offenbach, and the left ureter had been injured, resulting in a ureterocutaneous fistula, the external orifice of which was in the scar of the former incision. Thirty dogs were nephrectomized, and the successful results determined him to perform the same operation on this poor woman. What a grand discovery this would be for the modern antivivisectionists of to-day. It is recorded that Gilmore, of Mobile, Alabama, in December, 1870, did the second successful nephrectomy in a woman five months pregnant. Von Bruns, in 1871, for lumbar urinary fistula with renal calculi and abscess, in the person of a German officer, removed the kidney, with a fatal result. In the same year Simon removed the kidney of a lady of Savannah, Georgia, for renal calculi, and it is said this patient was a martyr to uncleanliness in the dressing of wounds, as death occurred from acute sepsis five weeks after operation. In the 70's efforts toward segregation of the urine were being made, and very ingenious methods, some of them very severe, were brought to light. That of Tuchmann, illustrated by Morris in his last work on *Surgical Diseases of the Kidney and Ureter*, was especially cruel. It was a forceps much like a lithotrite; by

means of its beak the ureteral orifice on one side was grasped to prevent the urinary escape from the corresponding side. In this way the urine coming from the opposite kidney was secured in the bladder. In 1875 Simon practised extreme dilatation of the urethra, and, by aid of a finger introduced into the bladder, ureteral catheterization was done. In 1870 we find Durham, of Guy's Hospital, and Gunn, of Chicago, cutting down to the kidneys and palpating them for stone. The same year Bryant, at Guy's Hospital, incised and explored the renal pelvis through a loin incision. At St. Luke's Hospital, New York, in 1872, Peters incised and explored a tubercular kidney for calculi. In 1873 W. W. Dawson, of Cincinnati, exposed a kidney by a loin incision and incised it, liberating pus and a calculus. This was probably the first authentic nephrolithotomy planned and executed. On May 15, 1877, Tauffer did the first uretero-cystotomy. The case was one of adherent ovarian cyst. In the removal of it he severed the ureter, and being unable to find the lower portion, he cut a small hole in the top of the bladder into which he sutured the ureter. Some leakage followed, but he states she was completely recovered forty-five days later. The following year Thomas Smith grafted both ureters into the colon on either side in a case of exstrophy of the bladder. He implanted one ureter, and fourteen months later the other one. Renal infection occurred with little delay, and death ensued. In the same year W. H. Baker, of Boston, implanted a ureter into the bladder for abnormal ureteral orifice. It was in the side of the urethra, and the successful operation was done by the vaginal route. In 1880, eleven years after Simon's first, Le Fort did the first successful nephrectomy in France. A few had been done in that country before, but with uniformly fatal results. The same year Pawlik gave to the world his method of ureteral catheterization which has done so much for studying the ureter and kidney. This year also found Henry Morris doing a well-planned nephrotomy for calculi. This practically sums up the status of

surgery of the kidney and ureter in 1880 From that time forward surgery of the ureter was rapidly developed. Aseptic and antiseptic surgery emboldened surgeons of every field. Invasion of the brain, chest, and abdominal cavities became less dangerous and formidable. Surgical technique became the great feature for study of all surgery. Investigators were chiefly working along the line of prevention of septic invasion of the operation areas. The micro-organisms that live in the skin or might accidentally be there received the attention of the bacteriologist working by the side of the operating surgeon. Methods of ridding the skin or mucous membranes were worked out fairly well, though no plan has yet been suggested that will completely remove from such tissues these dangerous organisms. The surgeon has become reconciled to the probability of never being able to rely absolutely on hand asepsis, and has adopted the use of the impermeable glove. This does not protect the wound from being contaminated from the contents of the patient's skin, but with proper cleansing methods this is greatly lessened. The generation which makes no advance over the work of the preceding one is practically dead. In the field of investigation, in better cementing the brotherhood of man, of uplifting the human family—in all of these advance must be constant. No one will say that surgery has not done full credit to itself during the past quarter of a century.

In 1887 conservative surgery of these structures was materially advanced by Czerny, who did a resection of a kidney for angeiosarcoma following injury. This, however, was not the first operation of the kind, as in 1883 Sir Spencer Wells had removed about one-third of a kidney unknowingly while removing retroperitoneal fibrolipoma. Recovery was perfect. In 1881 Hahn is found doing nephrorrhaphy for movable kidney, an operation that is done thousands of times annually, and in the same year Grünfeld published his attempts at using reflected light in the vesical endoscope.

In 1882 Bardenheuer did two unprecedented operations. One of them was suturing the wound after incising and exploring the pelvis of the kidney for stone. Some leakage followed, but only for a few days. The other was making a ureterocutaneous fistula in a case of extensive necrosis of the ureter as a result of an impacted stone in it. In that year Nussbaum attempted to unite the two ends of a ureter where an unintentional resection in continuity had been made by means of a fibrous channel. In 1884 Morris proposed rapid dilatation of the female urethra and urethrotomy just in front of the prostate in the male, and then proceeding transvesically to remove calculi from the very lowest portion of the ureter. Emmet at the same time did vaginal ureterotomy for ureteral calculus, removing it with a curette, and Cullingworth, in 1885, planned and performed ureterolithotomy through a lumbar incision. In 1887 Ceci removed a calculus from the pelvic portion of the ureter through the rectum. Desault, in 1887, used and recommended his kiotome for incising the ureterovesical junction in order to more easily reach and remove calculi in the lower ureter. In 1888 Richmond, of Missouri, succeeded in removing a stone lodged near the exit of a ureter by means of rapid urethral dilatation and the introduction of a finger and tenaculum. In 1886 Israel was removing stone from the highest part of the ureter—the pelvis. In some of these cases access to the pelvis had been gained by splitting the kidney. We find this work was rapidly taken up by Bergman, Kirkman, Hall, Twynam, and others, all doing it previous to 1890.

During this decade we find efforts toward exploration of the ureter and obtaining the contents of them were being made. Warkalla recommended temporary ligation of the ureters through the vagina in order to differentiate the urines. The ligature would be tightened on one to get the urine exclusively from the other. Hegar had earlier proposed it, and Sanger had recommended the ligation to be done by the same route as for ligation of the common iliac

artery. Warkalla proposed to employ the knee-chest position and not to tie the ligature, but to make sufficient traction upon it to control the passage of urine along the ureter. He succeeded ten times out of thirteen trials on the cadaver. The instrument of Tuchmann has already been described.

Following the work of Grünfeld and Simon, Newman, of Glasgow, in 1883, devised an electric lamp which could be introduced into the bladder, and its interior, including the ureteral orifices, readily seen. In 1888 Bozeman, of New York, succeeded in catheterizing the ureter through a vesicovaginal fistula and flushing out the pelvis of a pyonephrotic kidney. Grünfeld's speculum and mode of catheterization readily suggests itself as the progenitor of Kelly's method and instruments, though Pawlik has made objection to Kelly's claims of originality. In 1880 Tuffier experimented on dogs to determine whether rectal implantation of the ureters was feasible, and decided against the operation. In 1881 Gluck and Zeller had like results. In 1886 Bardenheuer failed in his experiments. In 1887 Novaro's results were more promising. Tizzoni and Pozzi, in 1888, implanted into isolated portions of the intestine with a better degree of success. In the same year Paoli and Busachi succeeded in one of four dogs. The work of Simon and Smith and the suggestions of Roux had stimulated them to take up this work. In 1887 Edmunds and Ballance, as a result of their investigations, concluded that the best method of disposal of both ureters when some graft was to be made was skin implantation. In 1888 Pawlik first successfully removed the bladder and implanted the ureters into the vagina. Sonnenberg, in 1882, grafted the ureters into the urethra for exstrophy of the bladder. In 1889 Brenner practised catheterization of the male ureter, and his work has led to great improvement in cystoscopes, although his contained the decided disadvantage of having the catheter tube on the convex side. At this time injuries to the ureters in the course of operations on the uterus and ovaries received the attention of the surgeons. In 1881 Spencer

Wells said out of ninety-four published abdominal hysterectomies that one ureter had been divided in six and both ureters in two other cases. Probably this is a much larger proportion of ureteral injuries than obtains at present, though no doubt many are severed or ligated or constricted by ligatures in their proximity. Hochstetter found in twenty-three cases of ureteral fistula reported that ten were due to vaginal hysterectomy. After Simon had proven the possibility of successful nephrectomy on man for such injuries, the only plan of treatment suggested, save the vaginal operations, was nephrectomy. The case of Tauffer demonstrated that conservation of the kidney function was possible.

In 1886 Schopf did the first ureteroureteral anastomosis by the transverse end-to-end method. Although his patient died on the forty-second day of tuberculosis, this case established the justifiability of the operation, and in 1889 Pawlik did the second operation with success. During that decade dilated ureters had been aspirated and incised and nephrectomy done to cure such cases. In 1887 Poggi severed the ureter in dogs, and then, by slightly dilating the lower stump near the section, implanted the upper cut end into it and sutured it in place. These experiments were eminently successful. Tuffier's experiments, as well as those of Budinger, assistant to Billroth, made in 1894, were notable failures. Tuffier says this was due to the strong tendency of the upper end to slip out of the lower one.

The first operation on man by this method was done by A. W. Mayo Robson in 1896. Previous to that seven had been done by the plan adopted by Schopf. In 1888 Paoli and Busachi experimented on dogs by performing ureterocystostomy. As previously mentioned, this operation had been done on man but once (Tauffer's case), and the number of ureterovesical fistulæ had become alarmingly large, thanks to the imperfect hysterectomies of the time, and especially those done by the vaginal route. These Italian experimenters severed the ureter, splitting the

proximal end of it and sutured it to the inner wall of the bladder. Novaro, in 1893, employed the method on man for the first time. To-day it is the best known.

In February, 1891, Tuffier did a partial ureterectomy, removing a considerable portion of the upper part of the ureter with the kidney, for intermittent pyonephrosis and stricture of the ureter. This was the first attempt at ureterectomy. The following year Reynier, for descending tubercular ureteritis and tubercular kidney, removed the kidney and part of the ureter. Two months later he removed more of the ureter, and five months after that operation he was obliged to remove more of the duct. Poncet, in 1893, profiting by the unfortunate experience of Reynier, removed the whole of the ureter for the same indication. The kidney had been removed in 1891. It was not until 1895 that the first complete primary ureterectomy was done. The operation was done by our esteemed fellow-member, Kelly, of Baltimore. In 1891 Küster, by the exigencies of the confronting situation, made an epoch in ureteral surgery. A boy, aged thirteen years, having a congenital absence of one kidney and having been subjected three years before to nephrotomy for hydronephrosis, was suffering from ureteral fistula and an impermeable ureter. Küster decided upon plastic operation for the relief of both of these defects. He removed 3 cm. of the ureter at the site of stricture, and, splitting the end of the distal portion and rounding the angles thus formed, he sutured it to the renal pelvis, and was gratified by securing bloody urine from the bladder. Several months later he closed the fistula, and the boy remained well.

Simon had operated on hydronephrosis by attempting to correct the angulation of the ureter, which had been the obstructing factor, and Trendelenburg, in 1890, had opened a hydronephrotic sac by lateral laparotomy and divided the ureter down to the lower part of the sac, to the inner wall of which he sutured the divided borders of the duct. The ureteral opening was thus displaced from the side to the bottom of the sac in order to maintain patency of the duct.

The patient died of ileus. Küster had planned to follow Trendelenburg's method, but was deterred by finding a stricture lower in the duct, and later he did the operation noted above. It remained for Fenger, in 1892, to first perform successfully an operation for valve-like constriction of the ureter. The following year Herman Mynter, of Buffalo, did the second successful operation of the kind. My own experience is in accord with the value of these two difficult operations.

As stated by Fenger and Küster, the successful ones were done through a lumbar incision. The two cases of Küster and Fenger positively demonstrated the feasibility of this method of dealing with dilatations of the ureter from angulations and valve-like constrictions. In 1892 Alsberg reported his case of dilatation of the ureter for stricture. In 1893 he furnished us with the report from his pen of the beautiful work Kelly had done in ureteral catheterization. He employed the catheter of Pawlik through the speculum of Simon and by bladder illumination by reflection from a head-mirror. This work of Kelly's popularized ureteral exploration. In that decade plastic surgery of the ureter was carefully studied. Davenport did infrapubic ureteral cystotomy for an abnormal ureteral opening near the external meatus urinarius in 1890 with success; and in 1892 Baumm reported an operation he had done in a case of double ureter, the supernumerary one ending at the mouth of the urethra. He did a ureterovesical grafting by suprapubic cystostomy. Colzi, in 1895, had a case nearly like Davenport's, in which he subjected the patient to a great deal more traumatism. He incised above and outside the labium major, detaching the genitals from the arch of the pubes, cutting away some of the bone from the lower surface of the arch to reach the base of the bladder. In 1893 Novaro had two successful bladder grafts for ureterovaginal fistula. In 1900 I was able to collect 88 cases of ureterocystostomy, and in 1903 111 cases with seven deaths, in four of which the operation was done in the course of an

abdominal operation for other conditions, and still another death was due to an independent cause.

Different methods were devised by Veit, Witzel, Fritsch, Boari, Kelly, and others; but practically the extraperitoneal route is the only one employed. For conservation of the mechanism at the ureterovesical junction secondarily and of the kidney function primarily, union of the ends of the divided ureter received careful study during the 90's. In reviewing the subject, in 1900, I found the transverse end-to-end, as used by Schopf and others, was not cast aside, but had been employed twelve times. The Poggi or end-in-end plan was practised three times, and modified by splitting the outer portion six times. The Van Hook method of end-in-side anastomosis was done five times, and the oblique end-to-end but once. De Urso and De Fabii experimented with the side-to-side plan with success, but thus far the operation has not been done on man.

During this time further attempts were made to achieve success in bowel grafting of the ureter. The experimental work of Morestin, Roscisewski, R. Harvey Reed, Thompson, Giordano, Van Hook, Krynski, Boari, Lestrade, Martin, Peterson, and others was pushed with great enthusiasm, though with direful results.

One man, Küster, in 1891, removed the bladder and prostate for malignant disease and grafted both ureters into the rectum. Death occurred in five days. The following year Chaput performed the operation twice, with one recovery. In this case but one ureter was implanted. In 1894 Maydl reported five cases of implantation of the ureters and trigonum into the rectum for ectopic bladder, death occurring in one of them from prolonged narcosis. In 1895 Boari, by means of his button, grafted the left ureter into the descending colon for vesicovaginal fistula with complete destruction of the urethra. The case is reported as a success. Chalot extirpated the bladder and grafted the ureters into the colon with success in 1896. Fowler devised a method the same year, and succeeded with it in

one case. Turetta, Peters, Krause and others reported methods and cases. Pozza devised a modification of Maydl's plan which was used in a number of cases successfully. In my review of 1900, as previously mentioned, sixty-five cases were collected. These had a mortality of 18, a few of them succumbing to shock.

Ascending renal infection was proven to be the most dangerous complication.

Rydigier, Laurenzi, Le Dentu, Pozzi, Chalot, Kufferath, Budinger, Harrison, Noble and others adopted the suggestion of skin grafting of the ureters between 1890 and 1900. Vaginal grafts by Chavasse and Kossinski, and urethral grafts by Estor, Eastman, Lindnet and von Iterson were made during the same period. During that decade the employment of the *x*-ray to determine the presence of ureteral calculi was enthusiastically investigated. Kelly's wax-tipped bougies are valuable for this purpose. Ureterectomy has become a quite common operation.

The segregators of Harris and Downes, devised during the past few years, have assisted very much in differentiating the conditions of the two kidneys. They were the outcome of certain objectionable features of ureteral catheterization, and are quite satisfactory.

This rambling tale of the past as relating to surgery of the ureter is already too long, but I hope to presume a little further on your time and patience to consider the present status of this work. What I will say of each subject must be brief, as the literature has already become voluminous, and the variations, both pathological and surgical, have received much consideration. I cannot hope to give this in detail, nor expect you to listen to a long story no longer new to you.

The treatment of ureteral calculi may first claim our attention, since the diagnosis and treatment of this condition are very much studied at the present time. The employment of the *x*-ray is the simplest procedure known for purposes of diagnosis, and were it accessible at all times and

completely reliable no other method would be comparatively valuable. Unfortunately such conditions as calculous anuria may render a patient in a secluded place so ill that this method of investigation is necessarily precluded. Moreover, no doubt calculi may be of sufficient size to block the ureter and give no shadow in the radiograph. That the calculus, composed of organic matter, largely or wholly, does escape detection by this method is generally understood. For this reason especially must other plans of examination be employed, although the necessity of constant manipulation of the ureter is a *sine qua non* to dexterity in treating other conditions of this structure. Palpation will ever have its important position. Exploration is an important method in such investigation. Tubular calculi may, however, escape discovery by this plan. The wax-tipped bougie, suggested and used by H. A. Kelly, is especially sensitive, and no doubt if it touches a calculus it will receive a telltale impression. In the treatment of ureteral calculi the proper plan is extraperitoneal ureterolithotomy, as infected urine is usually associated with this condition and easily produces peritonitis if permitted to come in contact with the peritoneum. If pus be not present the establishment of ureterocutaneous fistula will seldom be necessary, though careful drainage of the wound will be advisable. This rule applies to every part of the duct. I am firmly convinced the ureteral wound should be made longitudinally whenever possible and sutured after lithotomy. If much necrosis of the ureter be manifest, as has often resulted from impaction of a calculus, each case must be treated according to the judgment of the surgeon, and such modifications as resection or exsection, with ureteroureteral anastomosis or ureterocystostomy, may rarely be required. It may be necessary in some cases to remove the portion of the duct necrosed, when on one side, and close the opening by the Heinecke-Mikulicz suture, thus increasing instead of decreasing the calibre of the duct at the site of erosion. Nor should these plans be neglected because of dilatation of the duct,

as usually some removable cause for the dilatation is present, and after correction allows the return of the usual calibre. Frequently pyonephrosis accompanies calculous ureteritis. Incision and drainage and probably nephrolithotomy will be needed in addition. The routes employed depend upon the location of the calculus, the bladder, vagina or loin being selected. I can only endorse the rectal route as employed by Ceci when examination reveals a calculus ulcerating into the rectum or threatening to do so. For ureteral fistula nothing need be done unless obstruction of the duct below the fistulous opening exists. In such a case the calibre of the canal must be restored. Usually the fistula will then close spontaneously, though so much cicatricial tissue may be deposited about the opening as to prevent closure. Suture or perhaps resection may be required in that case.

Strictures and angulations require careful consideration. The former will occasionally yield to dilatation. On this subject I confess to much skepticism. I believe that in multiple, slight strictures it should be tried, of course, by the transvesical route. If dense it will probably be much better to expose the lesion by incision and exsect or incise lengthwise the duct and suture by the plan used by Fenger. Surely for angulations this plan has no superior. In two cases I have been rewarded by perfect recovery. If the kidney be displaced this defect should be corrected and may be the only necessary procedure.

In subcutaneous injury of the ureter no treatment is advisable unless evidence of extravasation of urine or of ureteral obstruction exists. When either of these are present an extraperitoneal incision with appropriate treatment of the injury should be made. If the injury be made through an incised or punctured wound no special indication for treatment is presented unless it be an unusually large wound or one probably infected. In either case no suggestion is needed as to the proper procedure. If complete division of the duct is made the ends must be united by one of the five

methods, previously mentioned, when possible. As to which is preferable in any given case will depend on various conditions. The operation has now been done about fifty times, and in but one has stricture been known to follow. This was the first, Schopf's, of transverse end-to-end union under many unfortunate circumstances. As to economy of length of ureter required for anastomosis the relative order of the methods is transverse end-to-end, oblique end-to-end, end-in-end, side-to-side, and end-in-side. As to subsequent leakage, the data available is insufficient to determine which is preferable. But four of the five methods have been employed on man, and one of them—the oblique—by myself but once. In that case no leakage occurred, while by every other method leakage has been reported. Van Hook states leakage cannot possibly occur; yet Henry Morris reports in his book, *Surgical Diseases of the Kidney and Ureter*, 1901, ii., 545, a case operated on by him in 1900 by this method that developed extravasation of urine into the lumbar cellular tissue on the eleventh day, and nephrectomy had to be done. If the upper end be large and the lower small, then Van Hook's plan is impossible as is that of Poggi. The transverse end-to-end is little better, and resort should be made to the oblique end-to-end or the side-to-side or lateral anastomosis. On the whole, I am inclined to believe the transverse end-to-end will be indicated in the largest number of cases.

If the site be in its lower two inches, then ureterocystostomy will be required. If the loss of ureteral length be too much for either of these operations, the plan of Van Hook for making a new lower portion from a long piece taken from the bladder wall is to be considered; or, when the injury is too high for that, grafting into its fellow, the bowel or on to the skin, or nephrectomy, or ligation of the ureter will be required. Their relative value is in about the order in which they are mentioned. The almost positively resulting renal infection from bowel or skin grafts causes one to reflect at length before deciding to employ

either of them. The method of isolating and sterilizing a portion of the intestine to receive the ureter and urine is meeting with favor. The plan of Gersuny of using the sphincter ani as a sphincter of the improvised reservoir made from the intestine is especially commendable. The ureter has probably never been implanted into its fellow, but when possible this will probably be the operation of the future as an alternative for skin or intestinal grafting. In bladder grafting of the ureter no method superior to that of Paoli and Busachi has been exploited. The resulting union can never be as perfect as the natural one, and thus far this operation is inferior to ureteroureteral splicing. The danger of stenosis, with dilatation of the urinary passage above, or of too large an opening, with reflux of urine, is to be considered. These results have been noted by Pozzi and Polk.

For partial division of the ureter suturing should be applicable. Most writers who have discussed this subject have said partial division, if involving more than half the circumference of the duct, should be made complete, and treated as such. The logic of suturing together the ends of a severed ureter and of not closing partial divisions, I confess, is not clear to me. To vaginal and urethral anastomosis I believe the only objection that can be made is the inconvenience resulting. Possibly the result of Nichaus' experiments may not be overdrawn, but I have considered them as being capable of severely taxing one's credulity. I cannot bring myself to believe that the posterior portion of the urethra is so easily transformed into a well-sphinctered urinary reservoir. Pawlik's case of vaginal grafting of the ureters after urinocystectomy had no infection; and, although the urethra was attached to the closed vagina, self-catheterization was a necessity. Mann has made this graft in two cases, but both died in a few months from extension of the original malignant disease.

Abnormal ureteral terminations of congenital origin may be corrected by ureterocystostomy, usually by the vaginal

route. Fortunately in these cases the ureter is abnormally long, and, therefore, the difficulty is much less than is the same operation for other indications.

The ureter must be removed in whole or in part for tumors, tuberculosis, and malignant disease. In 1899 I was able to collect from the literature but twenty-four cases of partial or complete ureterectomy; now the number has swollen to nearly one hundred. When the malignant disease involves the upper portion removal of the pelvic and lower portion is rarely required. The case of Abbe's is significant in this respect. The converse, however, does not obtain, as the lymphatic circulation is upward. In tuberculosis of the upper portion of the ureter I am very much in doubt as to whether the lower portion should ever be left *in situ*. Calculi and suppuration may work such destruction as to require removal of the larger part of the duct, but usually not the whole of it. The extraperitoneal route should be the preferable one, as the danger of infection by it is less. If the abdominal route is much the easier for the surgeon the mortality from it is much the greater.

In complete ureterectomy or nephroureterectomy in women, probably the loin and vaginal incisions constitute the best plan. In my last case I separated the lower two inches through a vaginal incision and then separated and withdrew the kidney and ureter by the loin route. This I believe to be the best of all.

For ureteritis the treatment has been largely of irrigation and topical applications. I have been disappointed in this work and have grave doubts of its being the best. Probably the violence done to the lower part of the ureter by this instrumentation counterbalances the benefits. I have had a few cases of trigonitis that have come to me after ureteral irrigations were said to have been made. I have in consequence been led to speculate as to whether a non-alcoholic, non-nitrogenous diet, with diuretics and rest in bed, may not be superior treatment for simple ureteritis.

A NEW DEVICE AND METHOD FOR INTESTINAL ANASTOMOSIS.

By W. P. Carr, M.D.,
Washington, D. C.

Many surgeons do not care for mechanical appliances other than needle and thread in doing intestinal work, and I think in simple anastomosis where the gut can be drawn out of the wound I can do the work almost as quickly without such aids; but frequently the parts are fixed and deeply situated, and it is not easy to see whether sutures are being properly applied. In such cases some device like the Murphy button is of great value. There are some objections, however, to the Murphy button. One is the fear that it may become occluded or cause obstruction in passing out. Another is that it is not always easy to apply even the purse-string suture around the button when the work is done deep in the abdominal cavity on fixed viscera. The strongest objection is that it does not give in gastroenterostomy a sufficiently large permanent opening.

I have devised a method of intestinal or gastrointestinal union by small silver clamps that I think is more easily and quickly applied, at least in some cases, and that has none of the objectionable features of the button. This method consists in clamping the inverted edges of the gut from the inside in the manner indicated in the accompanying drawings. These drawings explain the clamps and method of applying them better than can be done by words.

With suitable forceps, such as I show, the clamps may be easily and quickly placed nearly all the way round, and

the small space that is left closed by a few Lembert sutures.

The anastomosis can be completed about as quickly as with the Murphy button. The clamps hold well and make an air-tight closure, as I have demonstrated on the cadaver. They are applicable to any sized intestine or wound. They leave a large opening in the lumen of the bowel, and pass out as easily as watermelon seed. The edge and corners of the clamps are smooth and rounded. They have small teeth, to prevent slipping, made by simply indenting the metal; but these teeth are not long enough to pass through the entire thickness of the bowel.

The clamp may be applied with any suitable flat, broad forceps; but it is better to have forceps with a slight ridge to keep the clamp from slipping, such as I show you.

This ridge should not be higher than the thickness of the clamp, so that it cannot possibly bruise or wound the intestine.

This method of joining intestines has, I think, none of the objectionable features of the Murphy button, is as easy of application in most cases and easier in some, and is applicable to any kind of intestinal or gastrointestinal union and to an intestine or wound of any size.

I have used these clamps in one case of resection of five inches of gangrenous ileum caused by strangulated hernia. This man recovered nicely, and most of the clamps were passed between the sixteenth and twenty-first days.

Since reading this paper I have received a letter from Dr. A. C. Bernays, of St. Louis, in which he says: "I see by the *Medical News* that you have some clamps for use in enterostomy. I wish to report to you that I have twice used the 'Agraffes de Michel' for the purpose of making a gastroenterostomy. The last stitches were ordinary Lembert seroserous stitches, but four-fifths of the gastroenterostomy was made with the Michel clamps, which I have used for years in place of superficial skin sutures. They seemed to work very well."

I should have supposed that the sharp tooth of the Michel agraffe was a contraindication to its use in intestinal work, as it must penetrate the bowel when clamped. I think the clamps I have devised will be found more suitable and that my forceps will be found more convenient for such use.

These clamps may be obtained from Lenz & Lassau, 623 Seventh Street, N. W., Washington, D. C.

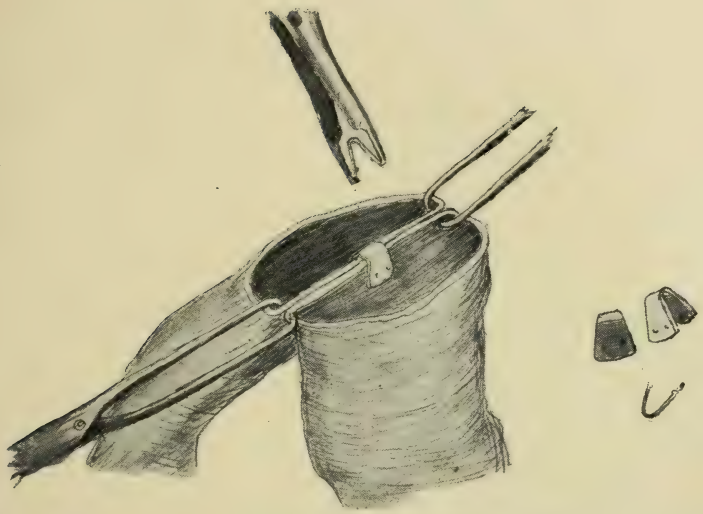


FIG. 1 shows the ends of the intestine held in position with tenaculum forceps. First clamp in place. Second clamp in forceps ready to be placed. Three clamps on the right in different positions.

FIG. 2. Intestine split longitudinally after being clamped, showing clamps in situ.

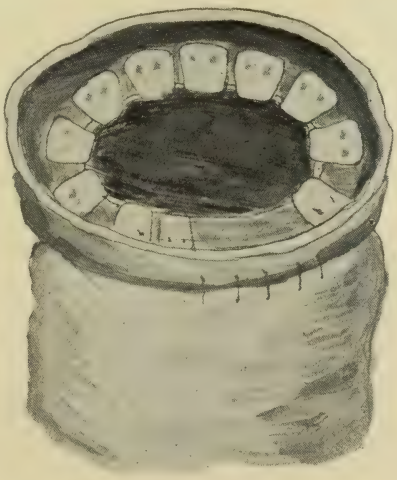


FIG. 3. Intestine cut across after being clamped, showing clamps in situ and five Lembert sutures used to complete the union. Three mattress sutures are usually sufficient; or a continuous suture may be used for this purpose.

ŒDEMATOUS ENCEPHALITIS.

A Study of Some Conditions Found in Operating for Cerebral Epilepsy and Allied Affections.

By W. P. Carr, M.D.,
Washington, D. C.

My object in reading this paper is to call attention to a condition of the brain that I have encountered quite frequently when operating for cerebral epilepsy and for suspected cerebral abscess following mastoid disease due to la grippe. The condition to which I refer is an œdematous encephalitis, and is apparently so much benefited by opening the skull and draining the excessive serum from the brain that I think it deserves careful consideration. I can most clearly present the subject by relating briefly the histories of a few typical cases with the pathological findings.

Case I.—White, male, aged twenty-seven years, barber. Family history negative. Began to have epileptic attacks when seven years old. At first they were frequent and severe, then, for ten or twelve years, they were slight and infrequent. For the past three or four years he has had attacks about every other day. Has had to give up work at his trade, and is afraid to go out on the street.

He has been treated by Dr. E. L. Tompkins for a year without effect. Dr. Tompkins, finding the attacks always began with a jerking of the left hand, referred him to me, with the request that I trephine him and examine or remove the cortical centre for the left hand. Accordingly he was operated upon at the Emergency Hospital, April 10, 1899. A large osteoplastic flap was turned down, exposing nearly the whole of the ascending frontal and ascending parietal

convolutions. The dura was fully one-sixteenth of an inch thick over this entire area and, as far as could be seen, under the edges of the bone. A crucial incision was made through the dura, and a startling appearance of the arachnoid, pia, and brain substance, as far as could be seen, looked like translucent, almost transparent, colorless jelly. Small bloodvessels could be seen ramifying in the substance of the brain three-sixteenths of an inch from the surface. A grooved director was carefully introduced into the brain substance in search of a tumor or cyst, and, at first, I thought I had pushed it into a thin walled cyst, for a stream of clear serum ran along the groove. I found, however, that this was due to a general œdema, and that serum would exude freely wherever the pia was broken. After an ounce or so of serum had escaped the brain assumed a more normal, opaque, white appearance and shrank away from the skull considerably. The bloodvessels of the pia were exceedingly thin walled and friable. A touch with the finger started a small vein bleeding. On attempting to ligate this vessel the catgut ligature cut through, and it was only by great care and gentleness that I was able to tie it successfully. A small piece of brain tissue was removed with a sharp spoon for examination; a piece of rubber tissue placed between the arachnoid and dura to prevent adhesions, and the wound closed without drainage. The patient made a good recovery, and for six months had no fits. His seizures then recurred, and he begged me to operate on him again. After several months of unavailing treatment with potassium iodide in large doses, and then with hydrobromate of hyoscine, I determined to operate again and keep up drainage for some time. At the second operation, nine months after the first, the tissues presented the same appearance as before, but the œdema was not quite so marked. The piece of rubber tissue was found intact, looking as if it had just been introduced. I had requested Dr. James Carroll, of the Army Medical Museum, to witness this operation and bring a suitable fluid for preserving a piece of the brain.

A small piece was again removed and turned over to Dr. Carroll. This time a piece of bone was cut away with a large trephine and a small soft rubber drain introduced through the membranes and left in for a week. A quantity of serum escaped, keeping the dressings damp for several days. The patient again recovered nicely from the operation, but had a recurrence of his attacks after only three months. The seizures have not been frequent or severe, however, since the second operation, and the man is able to work at his trade. He considers himself practically cured, and is very grateful.

The piece of brain removed at the first operation was not satisfactorily stained. The second piece was prepared by Dr. Carroll in several different stains. I will pass around photomicrographs of these sections and read Dr. Carroll's report, which is as follows :

" In the earlier specimen the dura appears as a mass of dense fibrous tissue, about 2 mm. in thickness. The few small vessels seen to pass through it are greatly distended with blood, and the deeper portion shows a very free hemorrhagic infiltration. The pia mater is thickened and adherent to the arachnoid and dura, and the line of union is the seat of extensive hemorrhagic infiltration between strands of newly formed fibroblastic tissue which contains young bloodvessels. The under surface of the dura is indicated by a number of large lymph spaces. The hemorrhagic infiltration extends to and surrounds the vessels of the pia mater, and it is also seen to have invaded the superficial layer of gray matter immediately beneath it. The superficial layer of gray matter shows a well-marked œdematous or dropsical infiltration, and many of the neuroglia cells and ganglion cells are surrounded by sharply circumscribed accumulations of droplets of fluid, giving the appearance of dropsical degeneration of cell protoplasm, but the nuclei of these cells are not affected. The neuroglia cells have also undergone proliferation and appear frequently in pairs and compact groups of from three to six. The

blood capillaries are engorged and are occasionally surrounded by small areas of hemorrhage.

"The pathological condition appears to be a pachymeningitis hemorrhagica, with capillary hemorrhages into the brain substance, œdematous changes, and proliferation of the cells of the neuroglia.

"In the later specimen the vessels of the pia mater are deeply engorged, and there is subpial hemorrhage as well as rather large free subdural hemorrhages which have separated the dura from the membranes underlying it. The vessels and capillaries throughout the brain substance in the section show the same engorgement as the vessels of the pia, and a few of the latter are surrounded by localized hemorrhages. There is also present an œdematous infiltration of the gray substance without appreciable changes in the cellular elements. There is no evidence of acute inflammation, and the condition appears to be one which might result from localized passive congestion through obstruction to the venous circulation by a tumor or a vascular thrombus or embolus.

"The sections have faded somewhat, so that the minute changes are less apparent than they were originally."

Case II.—O. H., a discharged soldier, while in the army was struck with the fist in the left temple, and remained unconscious for three hours. Since that time has had frequent epileptic attacks at irregular intervals. These attacks were not severe until after an attack of influenza, which occurred about two months after he received the blow on the head. He has an aura which he describes as a dripping sensation over the seat of injury.

Operation at the Emergency Hospital, November 11, 1898. A large button was removed with trephine at seat of injury. Dura, one-sixteenth of an inch thick as far as could be seen. Brain very œdematous, presenting the same appearance as in the preceding case, but not such marked œdema. From one to two ounces of serum escaped along the grooved director, which, at one point, apparently entered

a cavity filled with serum. There were no adhesions, and nothing else was found. Wound closed without drainage. Patient made a good recovery and had no more attacks when last heard from, about a year after the operation.

CASE III.—Wm. P., male, white, aged twenty-six years. History of idiopathic epilepsy of several years' duration. Attacks more and more frequent and severe in spite of treatment. Had several attacks of influenza in last three years. Was kept under observation in the ward for three days, and during that time had a dozen attacks, some slight and others severe.

Operation June 22, 1899, at the Emergency Hospital. In this case a button was removed, over the left upper Rolandic area, through which the brain was drained and a linear craniotomy done by cutting with the De Vilbis instrument from this opening two and a half inches forward and two and a half inches backward.

The same condition of the brain was noted as in the previous cases, but not so marked as in the first. Serum drained freely from the brain. For several days after the operation the patient was reported to have had, daily, slight attacks, but upon close questioning these attacks seemed to be hysterical rather than epileptic. After a few days they ceased, and the patient made a good recovery. He was still free from recurrence nearly two years later, when last heard from.

CASE IV.—A man, about fifty years old, sent to me for operation by Dr. Richard Washington. He was in a stupid mental condition, with well-marked aphasia and a partial paralysis of both legs and arms, more marked in the legs. Was unable to feed himself or walk, but could move his arms and legs freely. This condition was thought to be due, possibly, to a blow on the head received ten years before, when he was digging at the bottom of a well and was struck in the upper parietal region by a falling brick. There was a scar, but no inequality of the bone. His temperature, as in all the preceding cases, was normal. I found, upon questioning his wife, that he had no trouble

after the blow on his head until about two months ago, when he had a severe attack that I believe from her description was influenza. After that his mental condition and paralysis developed.

Operation at the Emergency Hospital, April 2, 1901. Osteoplastic flap turned down over seat of supposed injury. No sign of injury found, but the same œdematous jelly-like condition of the brain was observed.

Microscopic section showed the same condition as sections from Case I., except that there was less thickening of the membranes and no punctate hemorrhages were seen. This patient recovered nicely from the operation, and improved slowly but steadily in both his mental condition and muscular power. In three weeks he could walk to the bath-room, and also feed himself. After leaving the hospital he continued improving, and is now working as a farm laborer.

I have seen the same condition of the brain in a case where I opened the skull in search of abscess where operation had been done for mastoid disease caused by influenza. No abscess was found. There was temporary relief following the operation, but mania and finally coma supervened, and death occurred a month after the operation. No autopsy was permitted.

It is impossible to say, in most of these cases, whether this œdematous encephalitis was caused by injury or by the poison of influenza, or whether it was a lesion of epilepsy.

Dr. J. Dunbar Forsythe has kindly spent much time looking up the pathological lesions of epilepsy for me in the library of the Surgeon-General. He has not been able to find any cases in which œdema was noted as a marked feature. But most of the examinations of epileptic brains have been made post-mortem and in very advanced cases.

It may be that this œdema is common and that it disappears after death or in the later stages of epilepsy.

Several cases are reported by Dr. Joseph Collins,[1] in

[1] Journal of Nervous and Mental Disease, 1896, vol. xxiii. p. 655 et seq.

which pieces of brain tissue were removed at operations for epilepsy and examined.

In several of these cases he speaks of the brain being softened and showing striking changes in the large pyramidal cell and great scarcity of cells. He also mentions a large number of hemorrhages in some of these sections. One case is spoken of as meningoencephalitis, chronic in character, with marked obliteration of bloodvessels in the pia and cortex, with formation of new capillaries which appeared to undergo hyaline degeneration. Text-books on nervous diseases give no gross or microscopic changes as occurring in epilepsy. Most of them speak of the lesion as ultra-microscopic.

In the last English edition of Kirke's *Physiology*, p. 202, is shown a cell labelled " swollen œdematous pyramidal cell from a case of status epilepticus. Notice diffuse staining and absence of Nissl's granules; the nucleus is enlarged and excentric. The lymph space around the nucleus is dilated."

From the way in which the subject is mentioned I infer that Dr. Halliburton, the editor, is familiar with the fact that œdema of the pyramidal cells is not uncommon in epilepsy.

He also states (*loc. cit.*) that in animals profound anæmia produced by ligating the vessels going to the brain causes marked œdema and chromatolysis of the brain cells. In extreme cases the nucleus is even extruded from the cell, apparently by great accumulation of serum.

Similar conditions are also produced by high temperature and by the action of various poisons.

It would seem that an œdematous encephalitis may be produced by anæmia of the brain, by passive hyperæmia, by toxæmia, or by injury, and that this condition is present in a very considerable number of epileptics, at least in the earlier stages of the disease. It seems very probable, also, that the toxins of influenza may cause it, and that this condition may be the usual cause of the cerebral symptoms so often observed in that disease.

Œdematous encephalitis may be either acute or chronic, and in the acute form may be accompanied by quite high fever. In cases in which this condition is suspected it is a question whether we should not trephine the skull and drain away some of this serous exudate.

It is impossible to say whether my cases were really benefited by the operation or not. They were too few to form the basis of any definite conclusions ; but the improvement in each case was marked and immediate, though in one of them only temporary.

The most plausible explanation for this improvement seems to me to be the sudden draining away of a large quantity of serum, with relief of pressure on the brain and perhaps the carrying off of toxic substances. We know that the good effect of draining inflammatory œdema on other parts of the body is most marked.

I am aware that operations for epilepsy not due to localized trauma have not given very encouraging results ; but some permanent cures have been reported, and temporary benefit has followed in very many cases. Perhaps if this condition of œdema becomes recognized and the serum more thoroughly drained away than has been done the results may be better.

In bad cases of epilepsy the prognosis is so gloomy that an operation offering even a slight hope for recovery is, in my opinion, justifiable, especially when that operation is almost free from danger and does not confine the patient more than a week or two.

In cases of severe cerebral symptoms following influenza or blows on the head, where the symptoms persist or grow worse after weeks of medical treatment, I think, also, that exploration is justifiable, in hopes of finding œdematous encephalitis or some other condition that will be benefited by operation.

But, whether we operate directly for œdema or not, I wish to call the attention of surgeons to this condition of the brain, for I am sure that it is frequently encountered in

moderate degree without being particularly noticed. Several surgeons of experience have told me that they had noticed it in operating for epilepsy and allied conditions, but had not paid especial attention to it. I feel sure that if the condition is more carefully looked for it will be frequently found, and we shall learn something of value about it.

In operating for œdematous encephalitis I should recommend that a large osteoplastic flap be cut with the De Vilbis craniotome over the site of any injury that may be suspected as a cause or over some location indicated by the symptom.

If the symptoms furnish no local indication and there is no local injury, then the flap had best be turned down in a convenient place, say the upper parietal region.

The exposed membranes and brain substance should be examined carefully, and if they present an œdematous appearance a grooved director should be introduced carefully into the brain substance in several places, and the serum drained off until the brain assumes a normal appearance. A small, soft drainage-tube should be inserted, just through the dura, into the subarachnoid space and left in place as long as there is a copious discharge of serum. This tube may be brought out through one of the small trephine holes made for the introduction of the De Vilbis instrument and stitched to the skin after the osteoplastic flap has been replaced.

If the head is carefully shaved and scrubbed and all proper antiseptic precautions taken, this operation is almost free from danger; and if only a small percentage of the serious cases can be cured in this way the operation will be justifiable. I have been encouraged by my very limited experience to believe that we may hope for recovery or great improvement from this operation in many otherwise hopeless cases of epilepsy and of progressive disease of the brain due to trauma and influenza.

DISCUSSION.

Dr. Charles H. Mayo, of Rochester, Minn.—The subject of œdematous encephalitis is a very interesting one to me. We have many epileptics and insane in the State of Minnesota, and as my brother and I have the surgical work in two large insane asylums, we have operated on many cases of epilepsy and of traumatic insanity, and I would corroborate the remarks of Dr. Carr with reference to œdematous encephalitis, although I have frequently referred to it as the water-logged brain. It has that appearance.

The method of dealing with these cases by drainage is a new solution of this class of work, or, at least, it is a good thing to advance, and the author of the paper has backed it up by the results which he has obtained. Epilepsy is a most unfortunate condition at the present time and for the future, and in many instances we cannot look upon it as a relievable condition.

As to why we have such a condition, it may be largely due to the peculiar structure of the brain. Of all structures in the body the brain has the least lymph circulation. The brain and spinal cord are the least active of repair of any structure in the body, and any structure which is capable of great repair has a large lymphatic system. The brain has almost none of what we call a lymph circulation, yet has lymph spaces; but with reference to the cells of the brain, if there is any region in the body in which we have fixed cells, it must be the brain, otherwise we would have no memory. So if we have an effusion of blood into the brain for a few weeks, months, or a year, if it occurs in the substance of the brain and cannot be absorbed, we get a brain cyst. If we have an abscess from infection of the brain it may not become absorbed by the lymphatics, and for months and years perhaps we have an abscess there without causing any more symptoms than those of pressure, if it happens to be in a location in which we can recognize pressure symptoms, for we cannot recognize an abscess more promptly in the substance of the brain than a cyst. Again, on the surface of the brain we have the arachnoid and subarachnoid spaces. If we have a hemorrhage on the surface of the brain, absorption may take place; so that we have traumatism of the brain and scar tissue, with punctate hemorrhages, and a local point of irritation. If we have an effusion that fills the lymph spaces, and there is very little circulation, only a small amount of the fluid can be absorbed; so that we have the pathology of chronic inflammation from irritation and effusion from bloodvessels, with the development of connective tissue. A chronic irritation affecting the brain will produce a sclerosis of the bloodvessels, and we have as a result cicatricial

contraction. If we have a sudden inflammation with hemorrhage, it may develop a cyst.

Drainage, as pointed out by the essayist, comes near affording these patients relief than any other one thing, and it is a good plan to remove a large area of dura in such cases.

Dr. W. L. Robinson, of Danville, Va.—Along this line I will mention two cases. A young man, felled by a falling limb in the woods, was brought from an adjoining county the next day to the hospital, unconscious most of the time. His pupils, pulse, and respiration were normal. Bowels and kidneys acting freely. He took food readily. No depression of skull, and no fracture detected by physical examination. He continued to improve slightly for six days, when suddenly stupor, depression, and Cheyne-Stokes respiration manifested this danger. Incision through scalp to bone revealed a triangular fracture one and three-quarters by two and a half inches, just as though a line had been drawn with ink. No depression. On removal by trephining at the angles I found a clot one-quarter of an inch thick and size of fractured angle. When the clot was removed the hemorrhage could not be controlled by curved needle; the arteries were ligated. Immediate relief followed to mind and body. The second case presented a similar history. Apoplectic attack, with labored breathing; evident deep-seated clot, dooming patient. Operative interference is indicated.

Dr. I. S. Stone, of Washington, D. C.—I think Dr. Carr deserves a great deal of credit for his originality and ingenuity. It seems to me, when mechanical devices are exhibited to us for intestinal work they are reminders of what we owe to Dr. Senn. I never see one of these devices but that I remember the early promulgation of his views regarding decalcified bone plates and the impression he made upon the minds of everyone at that time.

I think the next time I have to make a gastroenterostomy or an intestinal anastomosis I shall try Dr. Carr's clamps, and I intend to do so after observing the plates and instrument itself. There is undoubtedly a field for all of these ingenious devices. However, I do not see how we can dispense with the Murphy button. I have three cases in mind in which the button is still supposed to be in the intestinal tract at some point. In one case a gastroenterostomy was done more than a year ago and the man still retains the button. In another case of diverticulum of the intestine, with obstruction, the Murphy button was used. The patient, a woman, is still carrying the button, with some anxiety. Thus far no symptoms of intestinal obstruction have manifested themselves. We must bear in mind the simple devices, and although this is an ingenious contrivance, we should not lose sight of the Brokaw segmented rubber ring, the McGraw elastic ligature, etc., all of them being useful instruments.

I will not take up any further time, except to congratulate the Association and Washington especially on the presentation of this device, as we are about to rival Chicago along inventive lines.

Dr. Guy L. Hunner, of Baltimore.—I have objected to the use of mechanical devices and have favored the intestinal suture; but it seems to me that Dr. Carr has exhibited a device which is simple and must prove a rapid method of suturing the bowel. I would like to ask him if he has any trouble in applying this clip or clamp, because of the different layers of the bowel rolling back? In doing intestinal resection, say, for large tumors of the mesentery or of the bowel wall, we sometimes have to drop the ends of the bowel some little time while we are taking care of the tumor, and when we go back to the bowel suture we find the serosa, or the muscular layers and mucosa, have separated and rolled back, and it would seem to me that this would interfere with his clip getting a good hold on all three of the coats. I would like to know whether he has had any trouble of that sort.

I shall procure a set of these instruments, try them on dogs, and see whether we get this interference from separation of the different intestinal layers.

Dr. J. Garland Sherrill, of Louisville.—Like Dr. Hunner, I have always been a strong advocate of the suture in preference to all other methods; but there are some cases in which probably a mechanical appliance like this might act nicely.

I can see a defect in this appliance of Dr. Carr apparently, and that is, when these little clips slough out they leave a piece of tissue which is not removed, and union could occur between adjacent pieces of tissue removed, resulting in constriction of the bowel. If it does that, then it is less effective than the Murphy button. But as I have said before, wherever it is possible to suture the bowel by thread and needle, it is the ideal way.

Dr. Vance, of Louisville, is a strong exponent of catgut in intestinal work. Personally, I have not been able to follow in his footsteps, because I have preferred silk. If we can get and use an absorbable suture in intestinal work, and use it just as effectively as this clip or clamp, I cannot see the advantage of having an appliance of this kind.

Dr. Carr (closing).—I have a page of my paper which I did not read, but will do so now, as it will answer some of the questions that have been asked. (Reading.)

Many surgeons do not care to use mechanical appliances in intestinal work; they prefer needle and thread. I think this clamp has none of the objections that are applicable to the other devices.

As to the separation of the coats of the bowel, I have only done the operation once on the human being. The patient was a man, and the operation was a success. As I have said, these little clamps began to pass out on the sixteenth day, and there

was no trouble with any separation of the layers of intestine in that case. It was a case of strangulated hernia where five inches of the ileum were resected, a cut made, and the clamps used immediately.

In using these clamps on the cadaver, I have had some trouble with the layers of the intestine slipping, but we have that trouble with any method or suture. I think the best way to overcome it is to have small tenaculum forceps to clamp along close to the edge where the perforation does no harm. I do not believe we can use these clamps in dogs, because the dog's intestine is very small and thick. In a pig it can be used very readily, as the intestine of that animal is thin and the lumen large.

As to the suggestion of leaving tags between the clamps when they come off, I will say that the clamps are put close together. I put them not farther than one-eighth of an inch apart. The little tag will round itself off in a little while. It is too short to reach over to the next one and adhere so as to cause stricture. I feel sure that in a week's time the tag will not be more than one-eighth of an inch long, and such tags in the intestine would be very much in the nature of small valvulæ conniventes.

If I have not made the description of this method perfectly clear to you with the aid of these pictures, I shall be glad to do so at the close of the session, as I have a piece of intestine and can easily make a demonstration.

FRACTURE-DISLOCATION OF THE SPINE.

By J. Shelton Horsley, M.D.,
Richmond, Va.

The history of laminectomy has been one of many vicissitudes. Dating from the seventh century and the time of Paul d'Egine, it has been alternately held in high favor or condemned as worthless. Its present status with many surgeons may be represented by a quotation from Sir Astley Cooper. In 1823 he said: "If you could save one life in ten, aye, one in a hundred by such an operation, it is your duty to attempt it, notwithstanding any objections which some foolish persons may have urged against it. Though I may not live long enough to see the operation frequently performed, I have no doubt that it will be occasionally done with success. There is no reason why it should not, and he who says it should not be attempted is a blockhead."

Bolton (*Annals of Surgery*, 1899, vol. xxx. p. 171) concludes an article on principles of treatment in injuries of the spinal cord as follows:

"Cells and fibres of the cord are readily destroyed, and once destroyed never regenerate. 1. Extradural hemorrhage does not give rise to cord lesions or symptoms, and requires no treatment. 2. Total lesions of the cord are immediate. The lesion is permanent and requires no treatment. 3. In hæmatomyelia the clot is absorbed; its site persists as a cavity, or is filled by newly formed tissue; irregularities of the circulation in surrounding positions of the cord adjust themselves. 4. In partial contusion of the cord the lesion results in permanent destruction of cells and fibres. No

treatment is available. 5. In open injuries of the cord there are destruction of cells and fibre and disturbance of circulation. But here active operative interference is indicated to remove foreign bodies, to facilitate disinfection, to prevent more extensive necrosis, and to facilitate drainage."

This view of Bolton's, pessimistic as it seems, was that of perhaps a majority of surgeons at that time, though Victor Horsley and others advocated laminectomy in these cases, and stated that the only danger was from sepsis. The *New York Medical Record*, in an editorial on the subject (February 23, 1901), says: "The present status of these cases of spinal injury seems to be expressed by saying that nothing can be done for those patients who have the symptoms of crush of the cord at any level; while in other patients the advisability of operating must depend upon the apparent requirement of the individual case, with the chances of doing much good, at best, but dubious."

John C. Munro (*Journal of the American Medical Association*, January 6, 1900) reports eighteen cases of laminectomy, and concludes that the operation is nearly hopeless in acute injuries to the upper half of the cord, though it should be done as giving the only chance of cure. Robert Abbe (*New York Medical Record*, March 3, 1900) reports four cases of spinal fracture, and advocates operating under cocaine. He says if loss of motion and sensation below the injury is instantaneous and complete, recovery is almost hopeless, though he has had one patient with these symptoms recover.

Perhaps the most important papers of late in giving a more hopeful view of the influence of laminectomy on spinal injuries are those of A. J. McCosh (*Journal of the American Medical Association*, 1901, vol. xxxvii. p. 569) and Harte and Stewart (*Philadelphia Medical Journal*, June 7, 1902). McCosh reports ten cases of trauma to the cord, and of this number four showed only partial paralysis of the portion of the body below the injury, or else marked improvement within twenty-four hours after the injury. The remaining six cases were severe, and were subjected to laminectomy.

Four of these died and two recovered completely. In one of the cases that recovered the injury was at the fourth cervical vertebra, in the other at the seventh dorsal. From their histories it seems most probable that without operation all of these six patients would have died.

The case reported by Harte and Stewart in a paper read before the American Surgical Association is of great interest as being one of the few cases recorded from thoroughly reliable sources in which the spinal cord regenerated. The cord was severed by a 32-calibre bullet, and complete paralysis followed at once; operation was performed three hours later. After removing the bullet at the seventh and eighth dorsal vertebræ there was an interval of three-quarters of an inch between the segments of the cord. These were approximated with catgut sutures. Sixteen months afterward the patient could voluntarily flex the toes, flex and extend the legs and thighs, and rotate the thighs, and had the sense of touch, temperature, pain, and position all over. She could stand by partially supporting herself with a hand on the back of a chair. In the discussion W. L. Estes reported a somewhat similar case, in which there were positive evidences of regeneration of the spinal cord.

It is certainly true that every case of fracture dislocation of the spine does not need operation. There is no hard-and-fast rule universally applicable to the treatment of any surgical disease, and surely fracture dislocation of the spine offers no exception. No one should say that all cases ought to be operated upon; it is equally bad policy never to operate on any. As in all other important surgical conditions, judgment should be exercised as to when to operate. The similarity between injuries of the spinal cord and injuries of the brain should be emphasized, as well as the fact that without an operation or a necropsy no one can always tell when the cord is completely destroyed.

The plan of McCosh seems excellent. He operates in all cases of complete paralysis below the injury, unless there is improvement within twenty-four hours after the injury;

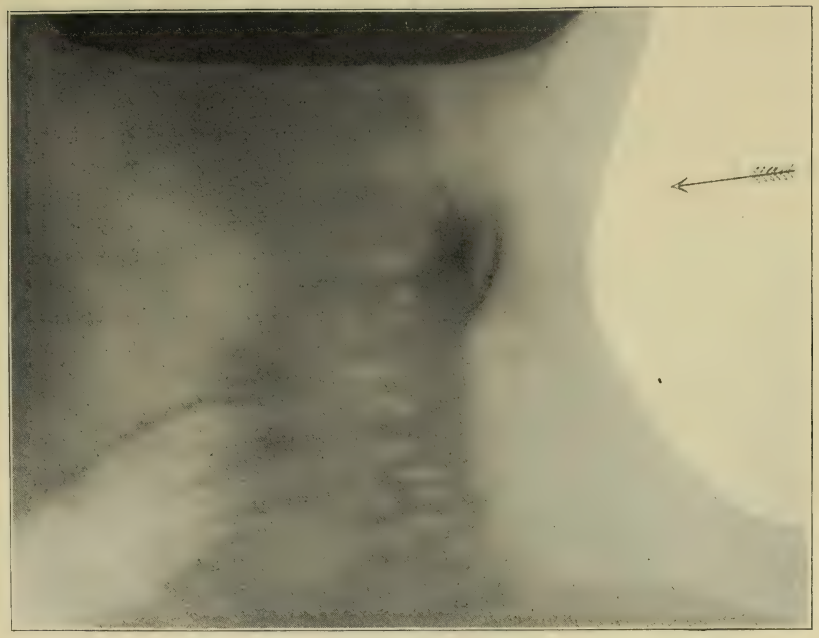
when the trauma is especially marked he operates sooner. He points out that the danger of delay lies in degenerative changes in the spinal cord, which set in soon after the injury. Early operation may arrest or at least lessen this degeneration.

Frequently severe injury of the cord may not kill immediately, but it nearly always leaves the patient a permanent invalid. The following two cases illustrate this :

Case I.—Mexican girl, aged fifteen years; referred by Dr. M. P. Schuster, of El Paso, Texas. I saw her for the first time on June 29, 1903. She gave a history of having been healthy previous to the accident; family history negative. About two years ago she fell from a high swing, striking on her buttocks. There was immediate paralysis of her legs, both as to motion and sensation. The bladder and rectum were slightly disturbed. After six months some improvement began in motion and sensation, and bladder and rectum acted normally. When I saw her, two years after the accident, the bodies of three lumbar vertebræ were twisted sharply to the right on an axis running through the spinous processes, which were not greatly altered in their position so far as their tips were concerned. The girl was thin, and the bodies of these vertebræ were so rotated that the right transverse processes could be distinctly palpated, and seemed just beneath the skin. The sacrum was dislocated forward, so the last lumbar vertebra was very prominent, and immediately beneath the skin. It had a very small spinous process. Bladder was acting normally; there was a tendency to constipation. There was absence of patellar and ankle reflexes in both legs. In the right leg there was complete loss of all sensation (touch, pain, and temperature) below the knee, and there was an area of anæsthesia extending up the posterior surface of the thigh to the gluteal fold. In the left leg there was total anæsthesia below the knee, except a small strip along the inner side of leg, inner side of foot, and inner side of great toe. In the left thigh the area of anæsthesia corresponded to that of the right.

There was no movement of either foot. Both legs could be extended and flexed quite readily, but not forcibly. She could not bear any weight on the feet. There was an ulcer over the lower part of the sacrum that had a tendency to heal, but when one part of it healed it seemed to spread at another point. She could sit fairly comfortably. Both legs and both thighs were much atrophied, and she was emaciated, but seemed in tolerably good health. No operation was deemed advisable in the condition in which I saw her.

Case II.—R. S., Las Cruces, New Mexico; American boy, aged fourteen years; previous health before accident was good, except he had always been nervous. When about ten years of age he was thrown from a horse and dragged some distance. Dr. B. E. Lane, of Las Cruces, was sent for. He found his head fixed to one side; it could not be moved in any direction. Closer examination showed there was a dislocation of an upper cervical vertebra which it was impossible to reduce. There was a good deal of pain, but no paralysis. He recovered from the immediate effects of the injury in a few weeks, and the following winter went to school. His head remained in the fixed position. About May, 1901, two years after the accident, he began to suffer from pains in his body and limbs; after two months there was paralysis of some of the muscles of his hands and arms, and an inability to stand on his legs, though there was no complete paralysis. He did not improve, and was referred to me by Dr. Lane in September, 1902. He was excessively emaciated and nervous. The head was firmly fixed in one position; a bony protuberance, probably a displaced portion of the axis, stuck out to the left of the middle line; his legs seemed almost completely paralyzed, both as to motion and sensation; motion was very slight, and only after great effort; there was weak voluntary movement of the thighs. There was weak motion in arms, forearms, and hands. Sensation seemed impaired over his whole body and neck, though existing in various degrees. He could not turn himself in bed. Bladder and bowels acted regularly and



Case II.—R. S., forward dislocation of the axis with the atlas.

normally. An *x*-ray picture taken at the time showed a forward dislocation of the axis, and a probable fracture of its spinous process and a part of its lamina. No operation was advised. I regret that the circumstances were such that I could not make a more complete and accurate examination of this interesting case. I have been unable to hear from him for six months, but believe that he is still alive.

The next two cases are instances of a rapidly fatal result following what was symptomatically complete severing of the cord. I have no notes of these two cases, and shall have to give them from memory.

CASE III.—Young man, American, aged about twenty-five years; was a lineman for a telephone company. While stretching the wire he fell from a telephone pole and struck on his shoulder, doubling up like a jack-knife. There was immediate complete paralysis of motion and sensation in both legs. The bladder and rectum were completely paralyzed. I saw him for the first time about four weeks after the injury. There was a deformity in the lower dorsal vertebræ, about the tenth or eleventh. Paralysis was still complete. He had several degrees of temperature, probably from a large sloughing pressure sore covering practically all of the posterior surface of the sacrum. No operation was advised. He died a week later, and I made a post-mortem examination of the spinal canal. At the site of deformity there was no trace of a spinal cord. The canal at this point was filled with old blood clots and a semifluid, grayish substance.

CASE IV.—A Mexican laborer, aged about twenty years, having the appearance of previous good health, was shot with a load of buckshot. One struck him in the shoulder and one in the spine, about the third or fourth dorsal vertebra. There was immediate complete paralysis of both legs and that portion of the body below the level of the injury. Motion, sensation, and the action of the bladder and the rectum were entirely abolished. The case was referred to me for treatment by his physician, Dr. D. H. Huffaker, and

I saw him with Dr. Huffaker a week after the injury. Pressure sores were forming, and in view of his bad condition, and the fact that several days had elapsed since the accident, operation was not advised. He died a few days later.

In the following two cases operation was performed after symptoms that seemed to indicate a complete destruction of the cord where the spine was injured. The technique followed was that generally recommended, viz., a straight incision over the spinous processes, pushing back the muscles from the spinous processes and laminæ by blunt dissection, biting off the spinous processes, and then removing the laminæ with a chisel or preferably a rongeur forceps. No plaster cast or other support was used after operation.

Case V.—L. C., Mexican laborer, aged fifty years; previous health good. On January 31, 1902, he fell from a wagon loaded with hay and struck on the upper part of his back. There was immediate paralysis of sensation and motion in both legs. He was referred to me by Dr. G. Wehrle, of El Paso, Texas. There was complete paralysis of sensation and motion below the injury; bladder and rectum were paralyzed, and patellar reflex lost. He suffered a great deal of pain. There was a marked protuberance at the site of the first lumbar vertebra, with a depression immediately above it. Temperature 99.5°, pulse 80. I operated upon him August 1st, making a straight six-inch incision over the spinous processes at the site of the injury. The spinous process of the last dorsal was fractured, and the dorsal spinal column was dislocated forward on the lumbar spinal column, so that the spinal canal of the dorsal vertebræ rested partly on the body of the first lumbar vertebra, thus partially occluding the canal. There was no fracture except that of the spinous process of the last dorsal. The cord had been caught between the last dorsal and the first lumbar as between scissors, but was not completely crushed, because the dislocation had not been extensive enough. It was impossible to reduce the dislocation, so the laminæ of the

twelfth, eleventh, and tenth dorsal vertebræ were removed. This released the cord and removed all pressure from it; the procedure of chiselling and biting away the laminæ and spinal processes was quite difficult, owing to the unnatural depth of the wound from the dislocation. It was important to leave no projecting spicule of bone. The dura was opened and the cord found to be somewhat mashed, but much less seriously injured than had been anticipated. A probe introduced under the dura for two inches up and then down the canal met no obstruction. Dura was sutured with catgut, and wound closed with small drain. Patient suffered great pain after recovering from the anæsthetic, but showed only slight shock. The following day his temperature rose to 103°, with pulse 129, but it rapidly subsided, and by August 4th (three days after operation) pulse was 88 and temperature 99.2°. Pain continued severe. There was no improvement of paralysis of motion, sensation, or bladder. Bowels moved after many enemas. It was impossible to keep him covered; he would even tear his nightshirt off. On August 7th his temperature and pulse rose slightly. He complained of severe pain in the right chest; there was dulness and impaired breathing in the lower lobe of right lung. He rapidly weakened, and, without his temperature becoming much elevated or pulse going over 100, died rather suddenly on August 9th. A post-mortem showed the wound in excellent condition, primary union having taken place, except at the small drainge point, and no suppuration had occurred there. The cord seemed distinctly softer than it was at the time of operation. The whole of the lower lobe of the right lung and part of the middle lobe were consolidated, and showed all signs of pneumonia.

Case VI.—T. H., Mexican laborer, aged nineteen years; previous health good. April 15, 1900, he fell from a house, about thirty feet, and struck on his back, probably on the upper dorsal region. There was immediate paralysis of motion and sensation in both legs, and complete paralysis of bladder and rectum. Examination showed absence of

patellar reflexes. There was deformity at the eleventh and twelfth dorsal vertebræ. His condition did not improve, and he was referred to me for operation by Dr. M. P. Schuster four weeks after the injury. He was operated upon May 17th under chloroform anæsthesia. A ten-inch incision was made over the spines of the lower dorsal and upper lumbar vertebræ. The spines and laminæ of the eleventh and twelfth dorsal were fractured, and some of the fragments driven in the canal. Part of an articular process had also been fractured and driven in the canal. These fragments were removed, and the rest of the liminæ of the tenth, eleventh, and twelfth bitten and chiselled away. The cord was almost severed, only a few fibres of its anterior portion remaining. The dura which had been torn was sutured, a probe having previously demonstrated the absence of other obstructions for two inches above and below the injured portion of the cord. The wound was closed with silkworm-gut, a small catgut drain having been put in. Recovery from immediate effects of operation was rapid. Temperature had been elevated one or two degrees before operation, but gradually fell, and a week after operation was practically normal. Three weeks, after operation his pulse became rapid and weak, going up to 120, with but little temperature, and his general condition seemed to be failing. This continued for two weeks and without special treatment, other than ordinary tonics and feeding, he began to improve. Sensation and motion slowly returned, though there was no sign of either for two months after operation. The first definite symptom of improvement was his passing urine voluntarily. This occurred six weeks after the operation. He had several bed-sores, none of which were severe, and all showed a tendency to heal. His condition as represented by the last report I have received from him, June 27, 1903, about three years after injury, is as follows:

Sexual desire was abolished at first, but is now normal, having returned in the last few months. The muscles of both thighs appear practically normal. Sensation in both

thighs is also satisfactory. The legs have improved but little, if any, in either motion or sensation. The muscles are atrophied, flabby, and without power. Recently a nail has come off a toe on each foot, leaving a raw surface. With some assistance he can stand, and with a great deal of support on each side can walk. His bladder and rectum act regularly and normally. His general condition now is best expressed by a quotation from a letter of Dr. H. T. Safford, to whom I am indebted for the notes on this case. "The patient is at present in fine physical condition, with the exception of the degree of paralysis which remains and has not shown any marked improvement of late. He is fatter now than before the injury, and quite comfortable, except for occasional pains he feels in his legs. His present weight must be nearly two hundred pounds."

DISCUSSION.

Dr. E. A. Balloch, of Washington, D. C.—This paper of Dr. Horsley brings up several points of interest, to me at least, because I have only recently seen a case of this character in which I was considerably at sea and did not know exactly what to do. In the first place, I wish to say that we seldom get those cases which are simply fractures of the spine and that alone. They are usually associated with other lesions. The accidents which produce fracture of the spine are so severe that generally we find that we have to deal with other things. In my case we had a fracture of the ribs, which was apparent, and at the autopsy we found, in addition to a fracture of the seventh and eighth ribs on the right side, the eleventh torn away from the spine on that side, and the eleventh and twelfth on the other, a fracture of the coccyx, and a slight rupture of the liver from pressure. That is one factor. Another is the location of the fracture.

Dr. Gallaudet, in a recent article, states that fractures of the lumbar spine are much more amenable to treatment, and we get better results in these cases than in any other portion of the spine. Indeed, the results are so much better that he proposes to put them into a class by themselves in estimating the mortality of this operation. The farther we go up the spine the greater the mortality until, in the cervical region, it is large indeed. Yet McCosh states that one of his most successful cases was one of fracture in the cervical region.

Most authorities agree that operation is not justifiable where there are no reflexes, yet a great many cases have been operated upon where there were no reflexes and recovery has ensued. It has always seemed to me that the condition of these patients, if no operation is done, is so very pitiable, with bed-sores, bladder disturbance, etc., that they appeal to us, and my own practice has always been to give them a chance. I do not think mere operation in itself adds particularly to the danger of the case, and if the patients are going to recover from the immediate effects of the fracture, yet be paralyzed, have bed-sores, be helpless and crippled, I think even with only a remote chance of doing them any good they are certainly entitled to that chance.

Dr. Maurice H. Richardson, of Boston.—I think that surgeons everywhere would like to get an authoritative opinion from such a representative body as this as to the proper course of procedure in fracture of the spine with or without dislocation. I for one welcome a renewed discussion of this question, which cannot, of course, be decided except by long experience. If it is the general opinion of a body of surgeons, representing every section of the country, that in cases of fracture of the spine it is our duty to explore, we shall then undertake, if not with confidence, at least with authority, an operation which, if not technically of great magnitude, is one of discouraging mortality, and thus far of little permanent benefit. My experience with operations of this character is small, and yet I feel more inclined to-day to attempt the relief of broken back than I ever did before. The tendency at the Massachusetts General Hospital, and I believe this is true of other hospitals in Boston, is toward radicalism in the matter of operating on these cases.

Dr. W. B. Coley, of New York City.—I have not had much experience with cases of fracture of the spine, and what little experience I have had does not make me agree entirely with the conclusions already expressed. I do not think the trend of opinion in favor of operation is as strong in New York as it is in Boston. The last case I had was examined by Dr. Pearce Bailey, a neurologist. A man, twenty years of age, fell thirty feet from an apple tree. He was picked up totally paralyzed; had some deformity in the lower dorsal region; was brought by train to me, a distance of one hundred miles. He was examined by Dr. Bailey and myself two or three times, and we found he had total paralysis of the lower extremities, bladder, and rectum, from a fracture dislocation of the spine. The question of operation was gone into carefully, and we decided not to operate. The patient was put in a plaster cast, kept on a water-bed for about a month, and at the end of three or four weeks symptoms began to subside. At the end of two months he went out, and at the present time he is enjoying good health. As I have said, my experience has not been large with this class of cases, but I do feel

there is a chance of these patients getting well sometimes without operation.

Dr. J. M. Baldy, of Philadelphia.—As most of you know, fractures of the spine do not enter into my line of work, but since listening to the remarks of Dr. Richardson I cannot refrain from saying a few words in regard to operative procedures. At a meeting of the Pennsylvania State Medical Society, it would seem from what was said that in the collieries of Pennsylvania the surgeons favor operating upon most of these cases. At this meeting of our State Society Dr. Lathrop, of Hazelton, one of the surgeons of the coal regions in whom we have great confidence, expressed a good deal of confidence in regard to operating on these cases, he having had an experience of about sixty cases. He stated that the accidents which cause these injuries were quite frequent in coal mines. He expressed the opinion, and the drift of the discussion was along the same line, that these cases ought to be operated on. It is true, as has been stated, occasionally a case will go along and get well without operation, as mentioned by Dr. Coley. But what of the rest? The vast majority of them lead a miserable existence, and eventually die. I do not see why the knife should be withheld in operating in this region when only a small additional risk is known to exist by so doing. The consensus of opinion of operators who work for coal mines is in the direction of giving these patients where the paralysis is complete a chance in every case by operating on them.

Dr. Horsley (closing).—I believe I pointed out clearly in my paper that I did not mean every case should be operated on. I do not wish to be understood as favoring operation on any ordinary fracture or dislocation that does not cause symptoms of paralysis. The main point of my paper dealt with that class of cases in which there is complete paralysis immediately following an injury of the spine. These can be divided into two classes. First, those in which there is decided improvement or some evidence of improvement within twenty-four hours after the injury has been sustained, and, second, those in which there is no improvement within this time. If after that time there is apparent improvement, it is usually unnecessary to operate. However, if there is no improvement at the end of twenty-four hours or more, I believe it would be better to operate on all cases in which there is complete paralysis below the seat of the injury. There is no question about the fact that some of these cases recover without operation. If any of you had operated on one of the cases such as I have had, in which the articular process was driven into the spinal canal, and had partly severed the cord, you would not question the benefit of operation in that case. Cases of complete paralysis following fracture and dislocation of the spine do recover without operation, but the point is this: You cannot always tell which cases are going to recover and which are not.

I am sorry that I have been misunderstood as being so radical as to favor operating in every case. I tried to avoid conveying that impression.

In regard to the general term "fracture-dislocation" of the spine, I will say that it is used in speaking of trauma of the cord. I do not mean fracture and dislocation of the spine as regards the osseous lesion, but merely as it affects the spinal cord. In the matter of repair of the cord it seems to me that it is a matter of guesswork more than anything else. It is like a good many other things; we cannot tell how a patient is going to repair until we have tried him. For instance, let us take some cases in which the lesion is practically the same in different individuals enjoying good general health. It may be under similar circumstances, and yet one patient will get well while others will not. The vast majority of patients operated on are disappointed in the results. But if we can save 10 per cent. of them by expectant treatment, and 15 per cent. by operative treatment, it is wiser to operate, in my judgment, where there is complete paralysis lasting twenty-four hours.

As to the location of the lesion, pointed out by Dr. Balloch, it is generally recognized that these injuries are much more fatal when they occur high up. The lower portion of the spinal cord tends to repair much more rapidly than the upper part. I believe I spoke of that point in the paper. It is better to give these patients a chance, in cases of complete paralysis which persists after twenty-four hours, by operating than by trying expectant treatment. The result reported in the last case was a fairly good one. The bladder and rectum act naturally; the patient can get about in a chair, and is comfortable.

CANCER OF THE INTESTINE.

By J. Garland Sherrill, M.D.,
Louisville, Ky.

My experience with several cases of secondary cancer of the intestine, and especially with two cases of primary carcinoma, specimens of which are here presented, has convinced me that many points of interest are connected with a study of this condition.

It is for this reason that this subject has been selected for consideration.

The term cancer as here applied is to be understood as including all forms of malignant neoplasms which involve the intestinal tract.

Tumors of the carcinomatous type occur with much greater frequency than do the sarcomata.

While it is claimed that cancer rarely attacks the intestine primarily, yet a study of the literature for the past twenty years will show that it occurs much oftener than we have been led to believe ; moreover, owing to the obscurity of the symptoms many cases are entirely overlooked, and many more are recognized but not reported. Hemmeter,[1] p. 681, mentions 69,083 autopsies, including the collections of A. Zemann, Maydl, Müller, and Nothnagel, with 5796 carcinomata, or 8.4 per cent. ; of these 1296 were of the intestine.

De Bovis[2] (*Revue de chirurgie*, June, 1900) has collected 426 cases of cancer of the large bowel, and states that it occurs once in every 2500 cases of illness, averages 1 for 300 deaths in hospital statistics, attacks males more often than females, and is seldom seen in children.

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Hochenegg,[3] of Vienna, reported to the Thirty-first German Medical Congress 282 cancers of the intestine from his own experience.

Nothnagel[4] found in *Wiener allgemeinen Krankenhaus*, from 1882 to 1893, that of 2125 autopsies upon cancer cases 243 were of the bowel; of 243 sarcomata examined during the same period only 3 involved the intestine. He quotes Müller, of Berne, who found in Berne, of 521 cancers 41 of the intestine, and of 102 sarcomata but 1 of the gut —the ileum.

Smoler, in fifteen years (1883–1898), out of 13,036 autopsies found 13 cases of primary sarcoma of the small intestine, or 1 in 1000 deaths.

These statistics show the great rarity of sarcoma of the intestine. With the exception of the rectum, sarcoma of the large intestine is still more rare than of the small.

Still Libman[5] gives 59 cases of sarcoma of the small intestine; Jopson and White[6] have collected 22 cases of sarcoma of the large intestine.

Nothnagel reports 12 cases, Smoler[7] 13, Treves[8] 18, R. H. Harte[9] 1 case, aged five years, and E. A. Robertson[10] has recorded a case of intestinal sarcoma in a child of four years near the ileocæcal valve.

With reference to the involvement of the different portions of the bowel the reports are not very complete.

De Bovis[11] (*Revue de chirurgie*) gives carcinoma of the small gut 6.3 per cent.; sigmoid, 11.9 per cent.; colon, 20.4 per cent.; rectum, 49.2 per cent. This would leave 12.2 per cent. for cæcum and appendix.

Nothnagel's 12 cases of sarcoma show 1 to involve the duodenum, 4 the ileum, 3 the jejunum, 3 the cæcum, and 1 the rectum.

Smoler's cases show 7 in the ileum, 3 in the ileum and jejunum, and 2 in the cæcum. The writers are all agreed that carcinoma attacks the large bowel with much greater frequency than the small, while sarcoma selects the small intestine and rarely involves the large gut. The appendix

is also the seat of both carcinoma and sarcoma, although it occurs very rarely, and is usually not recognized as a primary lesion, except by the microscope after the removal or autopsy.

E. Hurdon[12] (*Johns Hopkins Bulletin*, August, 1900) reports a case of primary carcinoma of the appendix, and mentions 10 cases in literature, of which only the 3 cases in which the diagnosis had been made by the microscope could be accepted.

Jessup[13] reports a case of carcinoma of the appendix, and has collected 13 cases. Gifford[12] has noted a case of primary sarcoma of the appendix. A. V. Moschawitz[14] presented a paper upon the subject of primary cancer of the appendix to the New York Academy of Medicine, March 5, 1903, and has studied the clinical picture from 16 reported cases, and says that the majority were reported after 1896. Dr. Weir, in discussion, reported a case of this condition which came under his observation in 1893 (see also *Record*, May 23, 1903). H. D. Rolleston[15] reports a case of primary carcinoma of the appendix occurring in a woman aged twenty-six years. F. R. C. Whipham[16] reports a case of primary carcinoma of the appendix.

Arthur W. Elting[17] reported to the Medical Society of the State of New York, January 28, 1903, 3 cases of primary carcinoma of the appendix which he had studied, and 40, including his own cases, which he had collected from literature. He says that the condition was probably more common than would appear from this record, for in several cases the carcinoma had been only accidentally discovered at autopsy, so that many cases were doubtless overlooked.

The disease showed a tendency to develop early; but the symptomatology was exceedingly vague. Men are more subject to carcinoma of the intestine than women.

De Bovis gives proportion as 53.9 per cent. males, 46.1 per cent. females; 85 operative cases collected by Cumston and Vanderveer[18] give 63.83 per cent. as the percentage of

males. The series of De Bovis is larger, and it is probable that his percentage is more accurate.

Sarcoma, as shown by Jopson and White in 22 cases involving the large bowel, attacks the sexes with about the same frequency ; of these, 12 were males and 10 females.

Age. Intestinal carcinoma according to De Bovis' collection is most frequent from forty to sixty years. In 35 cases occurring from eleven to thirty years, 23 were females; in 66 cases in the collection of Cumston and Vanderveer, the average is forty-two years, the youngest being nineteen years and the oldest sixty-seven years; only 8 are under thirty years.

The ages of the sarcoma cases range from two to sixty-six years in Jopson and White's statistics; 7 were under ten years, while only 3 were past forty years.

The variety of carcinoma most frequently met with is, perhaps, the adenocarcinoma, although this point is not covered in any of the reports.

Spheroidal-celled carcinoma, either of the scirrhus or medullary type, is also found. Squamous-celled carcinoma is rarely present except in the rectum, where it springs from the tissues near the anus. Colloid changes are observed in some of the cases.

The sarcomata assume most often the round-celled type; 50 per cent. of the cases of Jopson and White were of this variety, 45 per cent. were lymphosarcomata, and only 5 per cent., or 1 case, was of the spindle-celled variety.

The adenocarcinomata rarely cause circular occlusion of the intestine, but this is the usual termination in the scirrhus. Any form of malignant disease, by infiltrating and matting the intestine together, may interfere with the fecal flow.

Two cases of sarcoma are recorded in which a dilatation of the calibre of the intestine occurred. Ewald[19] mentions a case reported by Bessel-Hagen of a boy, aged seven years, in whom, during the course of an extensive sarcomatous infiltration of the jejunum, there had formed an aneurysm-like dilatation of the size of a large man's fist.

Jopson and White mention a similar condition in their case.

Not infrequently does inflammation attack the tissues around a malignant growth; this is especially true in cases in which ulceration has begun. This was a prominent feature in my first case, and from the number of reported cases simulating appendicitis I conclude that it has occurred in some of these as well.

A lymph node taken from my case showed inflammatory changes, but no cancerous infiltration.

Metastasis from carcinoma of the gut seems to occur most often through the blood, and the liver suffers most frequently from secondary deposits.

Sarcoma, on the other hand, according to Jopson and White, in 68.4 per cent. shows secondary involvement of the mesenteric glands, 26.3 per cent. of the peritoneum, 10.5 per cent. of the lung, 10.5 per cent. of the kidney, 10.5 per cent. of the spleen, 15.7 per cent. of the liver, and 10.5 per cent. of other glands.

Tuberculosis is noted as a complication of cancer in a few cases. Invagination is a very frequent accompaniment of this condition in at least 10 per cent. of the reported cases.

The cause of these growths is as little understood as that of cancer in any locality, and it is beyond the scope of this article to enter extensively into the discussion of the various theories offered to account for the abnormal cell growth which results in the production of these neoplasms.

Among the various theories may be mentioned those of Cohnheim, Ribbert, and many others based on histogenesis. The questions of diet, heredity, traumatism, and irritation have been well considered.

The trend of recent opinion has been toward the parasitic explanation, the experiments of Schiller, Gaylord, and others leading to this view, while the researches of the Harvard Cancer Commission seem to disprove the claims that a parasite is the causative agent.

Personally, I incline to the parasitic as the best explana-

tion so far offered, it having some weighty arguments in its favor; but consider it by no means proven.

The usual point of origin of these growths cannot be established from the present literature upon this subject. A frequent site is the follicles of Lieberkühn. Undoubtedly the primary carcinomatous growths must spring from the mucous membrane or its glands, and this view is borne out by the reported cases of carcinoma of the appendix, where the disease has been detected at its inception.

The following statements are made in connection with H. D. Rolleston's case in support of this view: "The facts that the growth was most extensive in the mucous coat, that it could be traced into the muscular coats, and that there was no growth in the peritoneum, showed that the growth originated in the mucous membrane of the appendix, and that it was not a secondary growth either implanted in the peritoneum or arising as a result from embolism within its substance."

Whipham's case also had its origin in the mucous coat. Jopson and White say that the point of origin in sarcomatous tumors is rather difficult to locate on account of the size of the tumor and the involvement of the bowel when the subject presents itself to the operator or to the pathologist; but from the data of the microscopic examination of the tumors which they have been able to collect, and from the careful examination of their own cases, it seems to them that the mucosa is the starting point of these tumors, and from the normal histology of the intestine it may be the origin, if we take it for granted that they have their origin in the lymph follicles.

The symptoms of either form of cancer affecting the intestine are very obscure, especially in the earlier stages, when interference might offer some hope. There may be present early some irregularity of the bowels, but, as a rule, this is not of sufficient moment to demand attention. After a time uneasiness, discomfort, or actual pain in the abdomen appears; owing to the gaseous accumulation this pain is

often colicky in character; it is general over the whole abdomen at first, later it may become localized over the seat of the lesion, and is often increased on motion. Although present in the majority of cases, the disease may exist for a long time before any appreciable pain is noticed.

As the disease progresses tenderness will accompany the pain.

If invagination develops as it does in some cases the pain will become acute, and the symptoms of that condition will be added.

Loss of flesh and strength is marked and progressive, greatly out of proportion to the discomfort of the patient even when the appetite is good and the digestion tends to accentuate the loss of strength; nausea and vomiting may occur, especially if any tendency to constriction of the intestine is present.

Alternating constipation and diarrhœa are often observed, being probably due to constriction of the gut, with impaction, which after a time excites a diarrhœa. When ulceration takes place the diarrhœa may become continuous and prove very intractable, even exhausting the patient so that death results. Hemorrhage from the intestine occurs infrequently; in fact, less often than we would naturally expect. It is most often seen in rectal cancers.

Many cases give a history resembling recurrent appendicitis, especially when involving the ileocæcal coil; attacks of pain lasting a few days or weeks with tenderness, nausea, perhaps vomiting, tumefaction in some cases, and a slight elevation of temperature, with relief by treatment, followed by a recurrence after a few weeks or months, are quite likely to be considered appendicitis.

My first case presented just such a history, and other writers have alluded to this resemblance, notably Spellissy,[20] who mentions cases reported by Janeway, Mühsam, Coley, and McCosh; C. N. Dowd[21] reports a case of annular carcinoma of the cæcum which followed the usual course of a slowly progressive appendicitis; Eugene Smith also reports

a case that had previously been mistaken for appendicitis. In Cumston and Vanderveer's collection 8 cases simulated appendicitis—those of Caird, Mayo (2), Bernays, Lockwood, De Launay, Pilcher, and Vanderveer. Libman reports 5 cases of sarcoma giving such symptoms.

The most constant symptoms of the disease are tumor, which appears in every case that lasts any length of time, and a cachexia which gives the skin a peculiar yellowish cast. Anæmia soon becomes marked, and the patient is more and more debilitated until he dies of exhaustion, unless obstruction occurs and makes a rapid end of the case. Sometimes, however, the first indication of the disease may be the development of an intestinal obstruction in a supposedly healthy man, as the usual symptoms may be absent.

An interesting feature of two of the reported cases is the presence of tuberculosis with cancer.

The duration of the disease is very uncertain; death has occurred in some cases in ten days after the first symptoms were noted, while others have had symptoms for ten years.

The prognosis is very grave. Unfortunately, treatment is usually applied so late that the results are not flattering. An early diagnosis and operation will give these unfortunates the best chance; therefore, we should not lose sight of the fact that such conditions present with some degree of frequency.

The diagnosis, owing to the vague symptoms, must be made largely by exclusion. Pain, tenderness, irregular diarrhœa alternating with constipation, dyspeptic symptoms, rapid loss of flesh and strength, even with good digestion; anæmia and cachexia, with an abdominal tumor will make the diagnosis. In the absence of tumor or some of the other symptoms an exploration is justifiable, and may often be productive of great good.

Hollander and Loeser[22] consider the formation of angiomata of the skin as suggestive of cancer, but this is probably of small diagnostic value, as is the enlargement of the cervical lymphatic glands mentioned by C. Tarchetti.[23] These

glands are anatomically so remote from the intestines that they are unlikely to be involved until very late in the disease. The similarity between appendicitis and intestinal cancer should call for special attention to this point in diagnosis.

The age of the patient is important, especially in making a differentiation between sarcoma and carcinoma. The rapidity of the growth is also important in this connection. Failing by the usual means of reaching a conclusion, exploration is clearly indicated.

The treatment is to be largely determined by the extent of the involvement. Resection of the intestine and extirpation of the growth offers the patient the only hope of a permanent cure, and this chance, though slight, should be given the patient whenever practicable, as early in the course of the disease as possible.

Any of the classical methods may be employed. When this procedure is unsafe a fecal fistula may be established to relieve obstruction if present, or to remove irritation from the passage of feces over the diseased tissue. In some cases short-circuiting of the diseased intestine by an anastomosis may be practised with benefit. When the involvement is too extensive to permit an operation, palliation is practically all that can be done, as visceral cancer has not responded to the Coley fluid, the *x*-rays, or to the injection of cancroin of Adamkiewicz.

Case I.—This patient, a white woman, aged twenty-six years, giving a history of repeated attacks of what was thought to be appendicitis, came to operation February 17, 1903. At that time she presented a painful tender mass in the right iliac region accompanied by nausea, fever, and a rapid pulse. The abdominal wall was quite rigid. Upon opening the abdomen the mass was found to consist of the cæcum and ascending colon, which were matted together on their outer side.

The peritoneum over this mass was thickened, and the tissues around showed evidences of inflammatory changes;

the mesenteric glands were enlarged. Posteriorly a small abscess was found, communicating with the lumen of the gut through a fistulous tract which had formed as a result of the ulceration of the neoplasm. The growth extended through the wall of the cæcum and colon, firmly uniting them. It appeared inside of the intestine as an irregular elevation about two inches in diameter, and quite firm in consistency. The small gut was not involved, the appendix was normal, and no other growth was discovered in the abdomen. A resection was the only thing to be done under the circumstances, and this was done by end-to-end suture, the dilatation of the ileum making this procedure comparatively easy. The patient rallied poorly, and died eighteen hours later from exhaustion due to shock and sepsis.

A microscopic examination showed the growth to be an adenocarcinoma. The mesenteric glands presented evidences of inflammation, but were free from malignant involvement.

Case II.—This man, white, aged fifty-four years, came to me on May 15, 1903, for relief from a fecal fistula which had persisted since September, 1902. The fistula followed an operation done at that time, according to his report, for an abdominal trouble, causing pain and fever.

I found him very anæmic, thin, and feeble. Examination revealed a fistulous opening at a point half-way between Poupart's ligament and the margin of the ribs, and just external to the outer margin of the right rectus muscle. This fistula was surrounded by a nodular mass about the size of a small melon, which also involved the adjacent skin and muscular tissue. The mass could be isolated from the deeper tissues of the abdomen. A diagnosis of malignancy was very readily made, and the patient fully informed of the gravity of the condition, and the slight probability of a permanent benefit. On May 16, 1903, this mass, which consisted of the cæcum and ascending colon, a mass of omentum, a foot of ileum, and part of the abdominal wall, was removed, and the ileum sutured to the transverse colon.

FIG. 1.

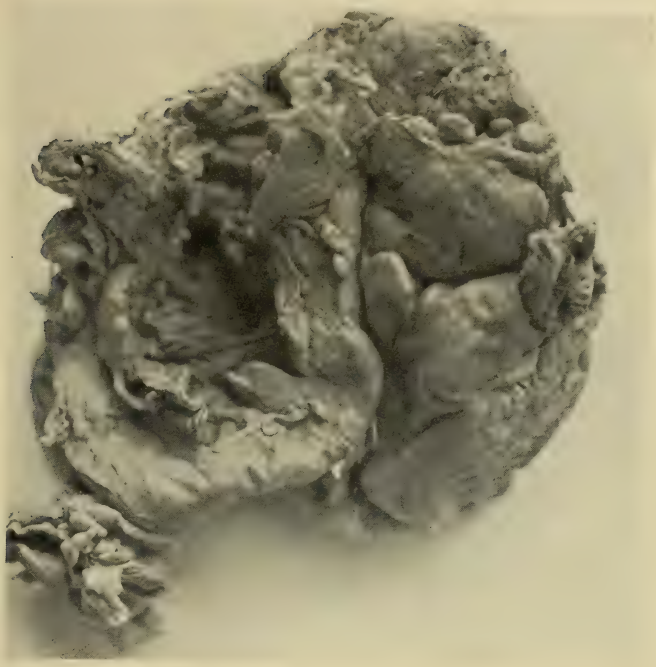
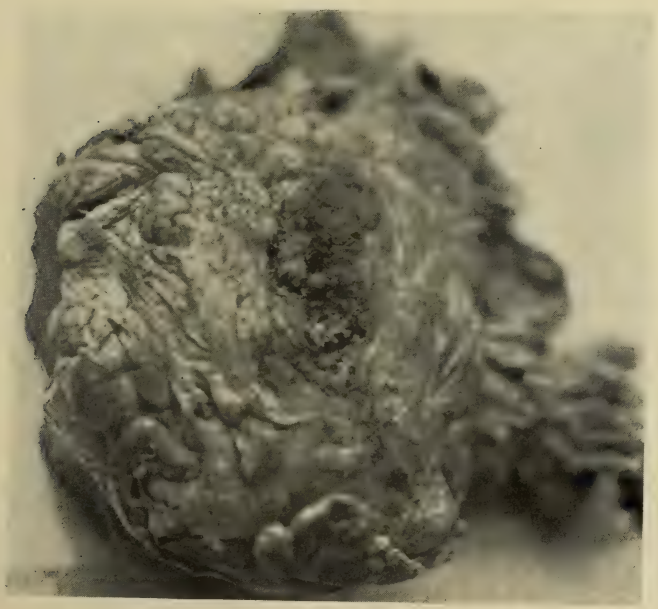
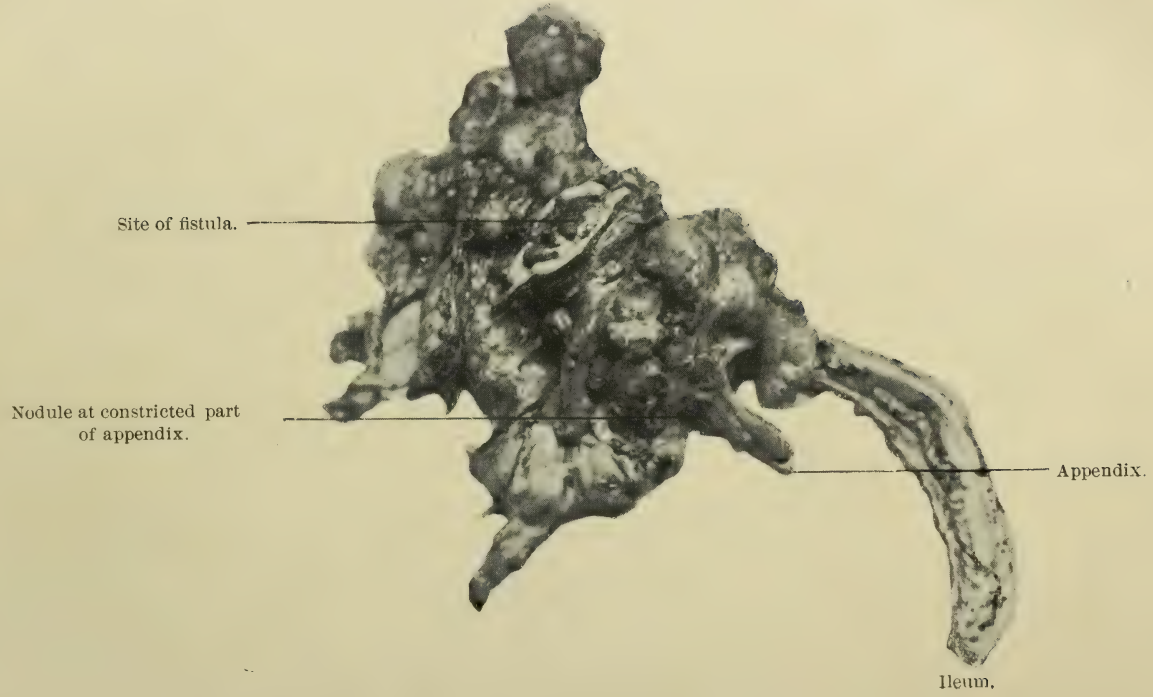


FIG. 2.



Posterior view.

FIG. 3.


Site of fistula.
Nodule at constricted part of appendix.
Appendix.
Ileum.

The patient made a very good recoverey, but from the last report it is probable that he has a recurrence. The neoplasm was made up of a number of gelatinous nodules, varying in size from that of a pea to that of an egg. These nodules looked like clumps of grains of cooked sago or rice, but were almost colorless or a pale grayish-white, very friable, readily separated from the mass, and had very little vascular connection.

One of these nodules was attached to the base of the appendix, which was distended at each end and constricted in the middle, and a number of isolated ones were removed from the peritoneum beneath the liver and on the posterior surface of the stomach.

The microscopic examination showed the growth to be a cylindrical-celled carcinoma undergoing a mucoid or colloid change.

Report of Microscopic Appearance of Case II.
By John E. Hays, M.D.

Sections taken from (*a*) the opening of the fistulous tract in the abdominal wall, (*b*) the body of the growth about the gut, (*c*) and one of the gelatinous nodules.

(*a*) The histological findings at this point show the skin of the abdomen very much thickened, particularly the stratum Malpighii. The papillæ are irregular in size and shape, but there is no invasion of the subcutaneous tissue by the epidermal cells.

The connective tissue is infiltrated by small round cells.

The edges of the section, including the wall of the fistula, shows an adenomatous growth composed of irregular branching tubules, lined by several layers of columnar cells, irregular in size and shape, with nuclei staining lightly in some and deeply in others.

The general appearance of the glandular structure is not that of the intestine, but more like the utricular glands of the uterus. As we go out into the tissue around the fistula

these glands become dilated and filled with a homogeneous substance, taking on a blue tint with the hæmatoxylin stain. In some the walls are still lined with columnar cells; in others the cells are separated from the reticulum of connective tissue, and lie in the centre of the space surrounded by the homogeneous substance, in which is embedded remnants of cells. As we get farther away from the fistulous tract the adenomatous structure is lost entirely, and there is seen only the reticulum filled with homogeneous substance.

The cells of the alveoli, where they are found in the centre, show various degrees of mucoid degeneration.

(*b*) The section of the body of the growth show the same histological picture, with the exception that the more typical adenomatous structure is not seen, only the dilated alveoli, as described above.

(*c*) In the gelatinous nodules there is a thin capsule of connective tissue throwing off the trabeculæ throughout the nodule, forming irregular alveoli, none of which is lined by cells, but some are filled with the homogeneous substance alone, and others have cells surrounded by this substance.

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DISCUSSION.

Dr. I. S. Stone, of Washington, D. C.—I have listened with a great deal of pleasure to this paper. It is a good one. I am not quite sure he made it clear that we are better able now to make early diagnoses in cases of intestinal cancer than we have been previously. The majority of us resort to inspection, careful examination, and manipulation of the intestines for the purpose of making a diagnosis, and I think this is the best course to pursue. I do not think any amount of clinical observation apart from that will be of much value.

So far as our experience goes, I know of several cases where an early diagnosis of cancer has been made in that way. I think if we ever get successful surgical results we will achieve them in that manner. In order to understand how difficult it is to be guided by the clinical symptoms, I will report a case in point.

I was called to see a case of bowel obstruction. The patient was a woman, forty-five years of age, a perfect specimen of health, who had not lost in weight unless it was during the time the signs of obstruction set in, about three weeks previously. Operation was performed for the relief of obstruction. Greatly to my surprise almost the entire mesentery was carcinomatous. Several feet of the intestine were practically included and narrowed by the carcinomatous growth. Here was a case of early diagnosis of cancer of the intestine. The physicians in that case were about as good as the average practitioner, perhaps a little better, yet they overlooked the diagnosis of cancer in that case. I would say that in nearly all cases you have mucous catarrh. In some so-called curable cases we have many more symptoms presented than you do in cases of early carcinoma. It has been my experience that the fewer the symptoms, the graver the disease; when we come to operate, we often find them inoperable.

Dr. Charles H. Mayo, of Rochester, Minn.—This paper presented by Dr. Sherrill brings up one of the most interesting subjects for discussion, and every additional case is an advantage to all who listen to such contributions.

In the majority of these cases a true diagnosis is not made; but we may have an opinion on the subject. We are operating in these cases for obstruction of the bowel. In the small intestine

it may be possible to locate and specify the character of the obstruction; but in the large intestine it is not always so easy.

Taking up the question of what to do after we have operated for obstruction and we find malignant disease, if the cancer involves the small intestine, it is a simple matter to relieve the obstruction by suture anastomosis, or by the Murphy button.

Then comes the question of obstruction at the ileocæcal valve. It has been a comparatively successful and not a difficult operation to remove the ileocæcal valve, cæcum, and ascending colon, and unite the ileum with the transverse colon. It is poor surgery to unite colon to colon in obstruction unless the bowel above can be emptied before or at the time of operation. Again, we may find a little ring of obstruction at the sigmoid, with a movable area and none of the glands involved, those glands which are in the immediate neighborhood. With the removal of this tumor, which may not involve more than two inches of the movable sigmoid, it is not easy to determine whether to do, in such cases, colostomy or anastomosis. Doubtless it would be best to make an anastomosis, and at the same time we hesitate from surgical failure to anastomose sigmoid to sigmoid if the bowel is full above. Then a very good way which has been advanced by Mikulicz is to make a median incision, remove the growth, and with the Connell or some suture method sew together the two ends of the open bowel three-quarters of the way round; then make the McBurney incision at the side, the same as for appendicitis, bringing the partially united bowel out of this opening for a temporary colostomy, and before it is brought into the McBurney incision insert a few stitches to hold the two parts of the sigmoid together; for four inches let it unite, and you have an ordinary fecal fistula. After a few weeks have elapsed, possibly two or three weeks, when there are adhesions, take a pair of forceps such as are used on the broad ligaments in hysterectomy, through the fistula slip one blade into each intestine lumen, clamp it, and it bites its way through for three and a half inches as does the Murphy button, and makes a continuous intestine. As to the remainder of the operation, the pressure unites the intestine. By making a long incision around the fistula, turning in, you still have the use of the anus, which is done without opening the abdomen a second time, and done at the secondary operation without an anæsthetic.

Dr. W. B. Coley, of New York City.—I should like to give the history of a case which was reported at a meeting of the New York Surgical Society a few years ago. It illustrates very well what has been said about cases simulating appendicitis. This patient presented all the typical signs and symptoms of recurrent appendicitis. In the early stages the man had no cachexia or other signs of cancer. He was operated upon by a surgeon in Canada for appendicitis, but was found to have an extensive carcinoma of the cæcum. I subsequently resected the cæcum and a

part of the ascending colon. But he had in addition an adherent small intestine, which had become cancerous by contiguity. I removed seven inches of the small intestine and did an end-to-end suture with the Murphy button; I then closed the cut end of the ascending colon and also that of the ileum, and by lateral anastomosis united the two by a large Murphy button, and closed the wound. The patient recovered and returned home in three weeks. The after-history of this case was that he lived two years. Very few cases go over one year. At the end of two years he died of generalization of the disease in the abdomen.

Dr. Maurice H. Richardson, of Boston.—Did I understand Dr. Mayo not to advise resection of the large intestine in all instances?

Dr. Mayo.—End-to-end union of the large intestine for anastomosis is a serious question if the bowel is filled above, as is frequent in cases of chronic obstruction.

Dr. Richardson.—You do not mean to say that you would not resect favorable cases of cancer?

Dr. Mayo.—I must not have made myself clear in my previous remarks. I would resect all the cancer if possible, and the question of the future would depend upon its location in making an artificial anus. No matter where the cancer was situated, in the ascending colon or hepatic flexure, I would take away the right-hand half of the colon and unite the small bowel to the transverse colon. I would make this operation which I have described, and which makes one serious operation, but secondarily it is very simple.

Dr. Richardson.—My experience in suturing the large intestine has been favorable. Most of my end-to-end suturing has been made in the large intestine, but not always for cancer. In one patient I have resected the sigmoid flexure twice for congenital dilatation. I have in several instances of cancer of the sigmoid successfully resected and made an end-to-end anastomosis. It has always seemed to me that in any method of suturing undue tension is likely to compromise seriously the integrity of the union. I have never seen performed the operation described by Dr. Mayo.

Dr. Mayo.—I have done two of those operations.

Dr. Sherrill (closing).—I have very little to say in closing. The point I especially wanted to emphasize was the diagnosis, and that probably we would recognize such cases more frequently if we looked for them oftener. I am sure that I shall have much less difficulty in recognizing a second case than I did my first one. In the future I will be more on the lookout for malignancy in cases of supposed appendicitis.

EARLY DIAGNOSIS OF CANCER OF THE UTERUS.

By F. F. Simpson, M.D.,
Pittsburg, Pa.

In presenting this subject it is my desire to speak of the necessity for a more diligent search for cancer of the uterus, rather than to refer to diagnostic technique.

The great body of the medical profession see but a single case of cancer during the time they are treating hundreds of other afflictions and naturally look upon that malady as being relatively rare. (See Appendix, 1.) As a malady it is infrequent, but as a cause of death its frequency is appalling. Early in 1900 a note was addressed to the health departments of American cities with an aggregate population of 10,000,000, requesting a tabulated statement of deaths from cancer and from all causes during each year of the preceding decade. The replies were prompt, courteous, and exact. The facts contained are worthy of close scrutiny, as they are based upon death certificates bearing the signature of legal practitioners of medicine. They are in strict accord with recent statistics from other countries. They show that of every fourteen people who reach the age of thirty cancer will claim one as its victims. (See Appendix, 2.) Who among you is not daily reminded of the awful havoc wrought by this scourge, which respects neither ancestry, purse, nor person?

Bearing more directly upon the subject of cancer of the uterus, however, is the distressing fact that *of every twenty-eight women who pass the age of thirty, one will be the victim of this disease.* (See Appendix, 3.)

It is humiliating, indeed, to reflect that probably more than 80 per cent. of these women perish without the question

of permanent cure ever having been seriously considered until long after the moment of success has gone. (See Appendix, Table IV.)

These grim facts force the conclusions that this disease is alarmingly frequent, that whatever the methods of the past may have been they are wholly inadequate, and that a radical change must come before we can gain mastery over it. A review of the literature and a critical comparison of results gotten in the early border-line and late hysterectomies done by Dr. Werder and myself have convinced me that cancer of the uterus is not only curable, but that it is easily possible to recognize it while still a local and hence a curable disease. (See Appendix, 4.)

This naturally entails some inconvenience and a deviation from established custom. It means that thinking people in and out of the medical profession must know the carnage wrought by this curse of mankind and must combine to check its ravages.

It seems to me that the first great obstacle to be overcome is lack of exact knowledge regarding the cause. We are fighting, as it were, a series of masked batteries, the nature of whose entrenchments and resources is unknown. As a result, 80,000 are afflicted with cancer and 43,000 die with it in our country annually. Is it the part of wisdom to observe this ghastly procession quietly and with resignation, or to combine for mutual defence?

Pending the time when greater knowledge of the cause of cancer may make prophylaxis possible, existing conditions must be recognized and met as they exist. At once we are confronted by the lamentable fact that, though curable, cancer of the uterus is rarely cured to-day. However deplorable this may be, it is not surprising, in view of the common experience among gynecologists, that quite 80 per cent. of these women do not come for operation until after the disease has gone beyond the limits of the uterus. Clearly the better therapy of the future, whatever its nature may be, depends upon better opportunities for early diagnosis. Lay-

men and men of our craft must know as a practical working fact that early in its rapid course cancer is a small local lesion with no general symptoms and with few that are local; that all these are common to the trivial afflictions of womankind; that their true significance cannot be determined without a careful physical exploration; that even as the suggestive symptoms appear the disease rapidly approaches the narrow limits of safety, and by the time the distinctive symptoms are suggestive to the patient, but too evident to the competent observer, parametrium, ligaments, and glands are usually choked by advancing infiltration, which inevitably foreshadows the end. How striking the contrast between the growing picture of impending death so long, falsely, and disastrously called the likeness of cancer, and the robust health, constantly seen in the early and curable stage of this disease!

In view of its frequency, of the paucity of early symptoms, of its rapid course, and the necessity for early diagnosis, the pertinent question arises, Shall we rely upon a chance examination or shall we advise a systematic search in women of the cancer age?

It seems to me that the course of duty, of humanity, and of wisdom lies in instructing women regarding these matters: especially that about or after the menopause, even a very slight increase in the frequency, duration, or quantity of bleeding (see Appendix, 5) or leucorrhœa due to any agency whatever, has pathology as its cause, and always demands a competent examination to determine whether simple or serious.

We naturally resent too great publicity regarding medical matters, for the truth is so often distorted thereby. Yet, may we not commit a greater error by undue conservatism? A public trust is reposed in us. Surely no other impending danger would be so sedulously screened until its relentless course is inevitable.

The uterus is so easily and so completely accessible for examination, and even short delay may mean so much, that

no doubt should be permitted to remain. A quarterly examination in competent hands should rarely fail to disclose the disease in time for permanent cure.

The diffusion of these vital facts need not be abandoned to the methods of yellow journalism. They can be readily and judiciously disseminated by medical men, and possibly, through censored articles, in the best scientific magazines as well. I believe the day is fast approaching when well-informed women of the cancer age will seek protection by regular quarterly examinations. Early diagnosis will then be the rule in cancer of the uterus, as it is in appendicitis to-day. It must be insisted, in this connection, however, that no other decision entails greater responsibility, demands more discriminating observations, or requires more logical and mature judgment, for error on one side subjects the patient to an unnecessary operation not devoid of danger, and on the other permits the disease to advance to protracted torture and death. Here especially must medical men do their whole duty to their patients. Those who do this, the highest type of expert work, should acquit themselves thoroughly for it.

APPENDIX.

(1) The average physician attests a death from cancer every three years —43,000 deaths from cancer in the United States annually—about 150,000 physicians.

TABLE I.

(2) Shows relative number of deaths from cancer and from all causes in the years given, together with the source of information.

1850.	1	death	from	cancer	to	150	deaths	from	all	causes,	U. S. Census.
1860.	1	"	"	"	"	109	"	"	"	"	"
1870.	1	"	"	"	"	79	"	"	"	"	"
1890.	1	"	"	"	"	47	"	"	"	"	"
1900.	1	"	"	"	"	35	"	"	"	"	"

—*Bulletin* of August 20, 1901.

My personal findings from various cities show:

1890.	1	death	from	cancer	to	42	deaths	from	all causes.	(See Table II.)
1899.	1	"	"	"	"	31	"	"	"	(See Table IV.)
1899.	1	"	"	"	"	14	"	"	"	over age of 30. (See Table IV.)

Autopsy records from Pathological Institute of the Vienna General Hospital:

1870–1881. 20,480 autopsies with 1640 cases of cancer (1–14) Maydl.
1882–1893. 20,358 " " 2124 " " (1–9½) Nothnagel.

Autopsy records from Pathological Institute of Berne:

1886–1891. 2621 autopsies with 521 cases of cancer (1–5) Müller.

(3) 29.5 per cent. all cases of cancer (2 sexes) affect the uterus—findings of Dr. W. H. Welch; Pepper's *System of Medicine*, vol. ii. Therefore one death in 47 (liberally, 25 per cent.; 1 in 56), 2 sexes, or 1 in 28 one sex, due to cancer of the uterus.

(4) Results: We did hysterectomy for cancer of the cervix 25 times more than 5 years ago, as follows:

Very early cases. A little uncertainty; 3 hysterectomies, 3 recoveries, 3 living and well to-day, 100 per cent. recoveries; 5-year period.

Early cases. Diagnosis clinically and microscopically positive; 2 cases, 2 hysterectomies, all well to-day, 100 per cent. recoveries; 5-year period.

Border-line cases. Diagnosis positive; operation in close proximity to diseased tissue; no appreciable involvement of parametrium; 2 cases, 2

recoveries, 2 patients living and well to-day; one 9 years 11 months, the other 5 years 11 months; 100 per cent. recoveries; 5-year period.

Late cases. Diagnosis positive; some infiltration of parametrium; little involvement of ligaments; operation done with hope of improving all and of saving an occasional case; malignant tissue cut through or crater opened into at time of operation; 18 cases. All are known to be dead to-day, though some lived 2, 3, and 4 years; 100 per cent. dead; 5-year period.

One hundred per cent. of early cases and only 18 per cent. of the above positive cases (hysterectomy for cancer of cervix), of all degrees of infiltration, alive and well to-day, *i. e.*, more than 5 years after operation.

(5) "In more than 15,000 gynecological cases, I have seen hemorrhage but *three* times at this time of life that could not be explained by some special ailment."—Dr. Edward J. Ill, *Medical Record*, October 9, 1897.

TABLE II.

Shows population, total number of deaths, and deaths from cancer in eighteen cities for the year 1890. Figures from official reports from respective boards of health, representing death certificates bearing signatures of legal practitioners of medicine.

Name of city.	Population.	Total deaths.	Cancer deaths.
1. Altoona, Pa.	35,000	581	10
2. Cambridge, Mass.	89,835	1,550	51
3. Chicago, Ill.	1,208,666	21,853	401
4. Cleveland, Ohio	.....	5,058	111
5. Lowell, Mass.	77,696	1,959	39
6. Lynn, Mass.	55,727	947	38
7. Massillon, Ohio	10,092	111	7
8. Minneapolis, Minn.	200,000	2,273	64
9. Newburg, N. Y.	23,262	396	7
10. New Orleans, La.	254,000	7,238	187
11. New York City, N. Y.	1,612,559	40,103	954
12. Oakland, Cal.	60,000	779	32
13. Philadelphia, Pa.	1,046,964	21,732	539
14. Pittsburg, Pa.	238,617	4,979	93
15. Providence, R. I.	132,146	2,877	72
16. Rochester, N. Y.	138,327	2,265	70
17. San Francisco, Cal.	330,000	6,650	227
18. Washington, D. C.	242,520	5,720	121
Aggregates	5,755,411	127,071	3023

We thus find that in the above cities in the year 1890 one death in every 42 was attributed to cancer, or, approximately, one in every 20 over the age of thirty.

TABLE III.

Shows total number of deaths and deaths from cancer in eighteen cities for decade 1890–1899. Figures from official reports from respective boards of health, representing death certificates bearing signatures of legal practitioners of medicine.

Name of city.	Total deaths.	Cancer deaths.
1. Altoona, Pa.	4,626	130
2. Cambridge, Mass.	14,492	526
3. Chicago, Ill.	249,980	5,632
4. Cleveland, Ohio	52,042	1,355
5. Lowell, Mass.	21,293	413
6. Lynn, Mass.	10,123	374
7. Massillon, Ohio	1,207	50
8. Minneapolis, Minn.	20,945	766
9. Newburg, N. Y.	4,673	90
10. New Orleans, La.	72,680	1,683
11. New York City, N. Y.	469,008	12,397
12. Oakland, Cal.	6,545	374
13. Philadelphia, Pa.	233,838	6,316
14. Pittsburg, Pa.	52,742	1,102
15. Providence, R. I.	29,443	938
16. Rochester, N. Y.	23,506	902
17. San Francisco, Cal.	71,388	3,377
18. Washington, D. C.	59,009	1,422
Aggregates	1,397,540	38,847

In the above cities for the decade 1890–1899, one death in every 35 was attributed to cancer, or more than one in 17 over the age of thirty.

TABLE IV.

Shows population, total deaths, and deaths from cancer in twenty-two cities for the year 1899. Figures from official reports of the respective boards of health, representing death certificates bearing signatures of legal practitioners of medicine.

Name of city.	Population for 1899.	Total deaths for 1899.	Cancer deaths for 1899.
1. Allegheny, Pa.	130,000	2,293	51
2. Altoona, Pa.	43,000	701	18
3. Atlanta, Ga.	125,000	1,998	28
4. Cambridge, Mass.	70,028	1,289	48
5. Chicago, Ill.	1,700,000	23,795	890
6. Cleveland, Ohio.	395,000	5,556	176
7. Columbus, Ohio.	140,000	1,562	59
8. Lowell, Mass.	90,114	1,848	44
9. Lynn, Mass.	68,513	1,018	51
10. McKeesport, Pa.	35,500	684	12
11. Massillon, Ohio.	13,000	136	7
12. Minneapolis, Minn.	225,602	2,082	95
13. Newburg, N. Y.	25,000	414	12
14. New Orleans, La.	300,000	7,893	161
15. New York City, N. Y.	3,356,722	65,343	2136
16. Oakland, Cal.	75,000	872	61
17. Philadelphia, Pa.	1,266,832	23,796	717
18. Pittsburg, Pa.	306,115	5,818	118
19. Providence, R. I.	175,599	3,162	132
20. Rochester, N. Y.	180,000	2,286	115
21. San Francisco, Cal.	360,000	7,108	398
22. Washington, D. C.	278,577	5,953	177
Aggregates	9,359,600	169,608	5486

Or 43,000 deaths from cancer in the United States annually.

In the above cities, for the year 1899, one death in every 31 was attributed to cancer, or about one in every 14 over the age of thirty.

DISCUSSION.

Dr. Henry T. Byford, of Chicago.—The only suggestion I would make is that we should inform the general practitioner, as well as the women, of the possibility of malignancy in these cases. More depends upon an early diagnosis than upon anything else.

The diagnosis of cancer is comparatively easy in the early stages if we look for it. I remember very well the time when it was supposed that extrauterine pregnancy could never be diagnosed with certainty, even by the best men; yet it was not two years before almost every practitioner in the country was diagnosing it. It seems to me that in the matter so important as cancer we would look for it, and if every general practitioner could receive a circular giving in detail the early symptoms and signs of the disease, it would lead them to suspect cancer of the uterus in many cases.

Dr. Maurice H. Richardson, of Boston.—While the suggestion of the essayist is an excellent one, I fear that practically it would be a difficult one to carry out. The average woman would be extremely nervous if the thought of possible cancer was periodically suggested by examinations at regular intervals. Yet, as the reader has said, it is only by examination that it is possible to tell. I find in my practice, which is wholly surgical, that many women come to me for the first time on account of irregularities of menstruation, and that in many instances the cause of hemorrhage is hopeless cancer. The great trouble is that cancer comes during the time when women expect the menopause to take place. All peculiarities and anomalies of flowing are attributed to the menopause. Some women flow and flow and think nothing of it, until ultimately they find they have cancer. This accounts for the deplorable hopelessness of most cases of cancer of the uterus.

Dr. Virgil O. Hardon, of Atlanta, Georgia.—I think every man who has practised any considerable number of years is in harmony with the views expressed in this paper to which we have just listened. Those who are doing special work have gone through the same experience as that detailed in the paper. Patients are sent to us after having been treated by general practitioners for a longer or shorter period of time before a correct diagnosis has been made, when it is too late to operate with any hope of effecting a permanent cure. The early diagnosis of cancer is not easy. Cases of hyperplasia of the cervix, of hypertrophy of the cervix, of engorgement of the cervix, often occur which have the appearance of early cancer of the cervix. But they are not cancer of the cervix, and cannot be proven to be such. In the hands of men who can bring to bear a sufficient amount of skill and care in the investigation, the majority of cases

of cancer of the cervix can be recognized sufficiently early to warrant an operation, with a fair prospect of permanent cure. But there is another point as regards this matter, namely, better still than the early recognition of cancer of the uterus is its prevention. In a certain proportion of cases it is undoubtedly possible to prevent this disease. It is as true to-day as it was thirty years ago, when Emmet promulgated the idea that the majority of cases of cancer of the cervix are due to a laceration of the cervix. If cancer is due to laceration of the cervix, early recognition of the laceration and its repair and a cure of the pathological condition which results from the laceration are the first steps, and the most successful steps, toward the prevention of cancer, the prevention of it rather than the cure after it is recognized, and I believe that if every man will adopt the plan of examining every woman who comes under his observation, particularly patients whom he attends in labor, and insist upon the repair of such lacerations when found, it will go a long way toward preventing many cases of cancer of the cervix that would otherwise come under our care. I know very well that in this modern day not so much stress is laid upon laceration of the cervix as was formerly done, but I believe from my own observations, and those of men whose writings I have followed in my reading, that this is the chief cause of cancer of the cervix, and that therefore the best way to treat the disease is to go back to its original cause, seek the laceration of the cervix, and repair it.

Dr. J. M. Baldy, of Philadelphia.—I dislike very much to take up so much of the time of the Association, and yet I cannot refrain from making a few remarks on this paper. I agree in the main with what the essayist has said on this subject, with the exception of one thing which puzzles me, and that is the statistics cited. I have always been dubious as regards the value of statistics. In fact, I have not the slightest particle of faith in them—I do not care from where they come. A man builds his own statistics and considers them from his own particular standpoint. If the next twenty men, for instance, were to take the same published statistics and attempt to build any theory on them, they would go astray ninety-nine times out of a hundred, unless they were used for the same purpose and in the same sense as the original compiler of them used them, and for that alone. The death reports from cities do not amount to a row of pins. We have here the statistics of death reports. The essayist has collected statistics from, I think, twenty-two large cities in the Union. Now, it is fair to say that there is not one single word of truth in the statistics given of a solitary city in the twenty-two. One case of cancer in thirty-six is absolutely shocking. I cannot conceive of such a thing in spite of the fact that the writer points out that it agrees with the German statistics; they are equally at fault. Take one set of the statistics of the essayist and see how they differ; see how they make the

others lie. According to these statistics, there are eighty thousand cases of cancer in the Union, and I think I do not underestimate the population of this country at eighty millions. This makes one case of cancer in every one thousand only, not one in thirty-six. Give me a man in whom I have confidence as to his knowledge of medicine and his opinion, and all the statistics in the world are as naught as against his opinion. If you get the opinion of a man who is personally known to be intelligent and honest, it will be much nearer the truth than statistics.

As regards the position taken by Dr. Hardon, with reference to cancer of the cervix, I have held for a long time that that theory is antiquated. We copy lots of things from Hippocrates down to the present day simply because we have not taken the time and trouble to investigate them. A man writes a book, three-quarters of which has been copied, the other quarter being made up of the author's opinions and experience. Half of the books written to-day are the results of opinions of men a hundred or a thousand years ago.

At a meeting of the American Gynecological Society, I asked any man in that Society to show me a single case of cancer of the cervix that had originated in scar tissue in the angles of the tear, and not a man could stand up and give me a case. I doubt whether any man in this Society ever saw a case in which he could honestly say that the point of origin or early beginning of cancer was in scar tissue in the angle of the tear. It begins, where? At the tip of the cervix, where the original mucous membrane was. I never saw a case begin any place else. I do not believe cervical tears have anything to do with the origin of cancer of the cervix. I have yet to see the first man with whom I have discussed the subject who could give me a single, solitary proof beyond his opinion that it was so. I want his proof, not his opinion, unless that opinion is backed by the proof.

Why do the majority of cervical cancers originate in women who have had tears of the cervix? Every obstetrician will tell you that seven-tenths of the women who bear children have a lesser or greater degree of laceration. It just happens to be true that this is just the time in the life of women when cancer develops. Now, is it not possible that cancer and the cervix laceration, both of which are so common, should frequently, most frequently, be associated? But that is not sufficient reason for believing in the cause and effect theory without further proof, and further proof is wanting absolutely. At any rate, I want to see cases of cancer in which the disease originates from the scar tissue in the angle of the tear.

I threw out the challenge and there was not a man at the St. Paul meeting of the American Medical Association, or at the Chicago meeting of the American Gynecological Society, who could point me out cases which he had seen. As a matter of fact,

most of them admitted that cancer did not begin there. I go this far as regards the cause of cancer, and no farther: Cancer inherent in the patient and going to develop in that patient is more apt to do so at a weak point than at a point which is normal. I am willing to admit that a cervix which is torn is weak and the cancer is more apt to develop there than elsewhere, but only slightly so. Beyond that I am unwilling to go.

Dr. Charles M. Rosser, of Dallas, Texas.—I should be exceedingly unwilling to challenge the statements of so great a man as Dr. Baldy, and I should be very unwilling to place myself in the attitude of questioning a statement which he has made, yet I am compelled, with the limited information which I have been able to gather, to state that a tear of the cervix may bear a very important relation to the formation or occurrence of cancer.

As to what Dr. Baldy said with reference to cancer not developing in scar tissue in the angle of the tear, I can conceive of a condition which technically we call subinvolution, a hyperæmic state due to an injury, failure of the uterine tissue to resume its normal condition, a hyperplasia of the cervix as we understand it; the circulation in that organ becoming less and less normal, the weight of the organ holding it out of its normal position, the dependent position of the organ rendering its circulation less continuous and perfect, therefore the resistance of the tissue becoming less and less complete; if there is any tendency whatever to the occurrence of cancer in that individual, then certainly by this train of circumstances we would have in the multipara or in the child-bearing woman a pathological condition which would furnish a happy site for the unfortunate state. The point, I think, is clear —it certainly is to my mind, and one which I think ought not to be overlooked.

Dr. Hardon.—If I may be allowed to speak again, I want to make the same point Dr. Rosser has made. To carry out the idea I expressed it is not necessary to assume that cancer of the cervix begins in the scar tissue at the angle of the laceration. Yet I can point Dr. Baldy to cases that have been reported where it was actually observed to begin there. Dr. Herman J. Boldt has reported one such case. Other cases are quoted in Cullen's book on cancer. It is unnecessary to assume them, since they actually exist. The fact is that subinvolution of the womb is present in the majority of cases of laceration of the womb. It occurs as the result of laceration of that organ. The fact of imperfect restoration of the uterus to its normal state is a sufficient explanation why a lacerated cervix constitutes one of those weak points in which, as Dr. Baldy has said, a tendency to cancer will show itself. Nobody contends that every woman who has a laceration of the cervix will necessarily have a cancer of the cervix, for it occurs only in those cases where there is a tendency to the disease. But we do recognize the action of that tendency in certain cases

when there is imperfect subinvolution, which furnishes a weak point at which cancer will manifest itself in preference to other points in which there is a perfect histological condition of the tissues.

Dr. Baldy.—The remarks made by Drs. Rosser and Hardon have really substantiated what I previously said, that cancer inherent in the individual, if it develops, is more apt to do so at a weak point than elsewhere. I admitted that much in my previous remarks; but I challenge the statement that laceration of the cervix causes or predisposes to the origin of cancer. Dr. Boldt and Dr. Cullen, to whom reference has been made, may be able to point out one or two cases in which cancer occurred in the angle of the wound. Why not? It might occur in the toe. It might occur in the angle of the wound absolutely independent of any injury, but such cases constitute such a great minority that it is absurd to build up a theory on them.

Dr. Simpson (closing).—I quite agree with Dr. Baldy that statistics may be used in a great many ways, and their value will vary with many conditions. The data here presented are extensive and in strict accord with recent statistics from other countries. They may not be mathematically exact in every detail, for death certificates are not always accurate. Yet they have this value—that they show the approximate views of a large number of medical men.

Even granting unavoidable errors, we find that they do not exaggerate the frequency of cancer, for they fall so far short of actual autopsy findings at the best pathological institutes known.

When my paper is carefully read it will be found that Dr. Baldy has confused my statements.

I agree with Dr. Richardson that women dislike examinations. Yet I believe that is the only way in which we can succeed in getting these cases early enough to do them any good. As intelligent women learn to know this fact and to know the real frequency of this disease, they will seek the best means of protection.

AMPUTATION AT THE HIP-JOINT FOR SARCOMA, WITH A REPORT OF SEVEN CASES WITHOUT MORTALITY.

By William B. Coley, M.D.,
New York City.

During the past fourteen years I have observed 17 cases of sarcoma of the femur and 22 cases of sarcoma of the thigh. The majority of these cases were hopelessly inoperable when they came under my care, but in 11 cases I performed high amputation. In 7 instances the amputation was made through the hip-joint, and in 4 cases just below the trochanter. It is to the results, immediate and remote, in these cases that I would especially call your attention.

In my 7 cases of hip-joint amputation the sarcoma started in the bone or periosteum in 5 cases and in the muscles or fascia in 2 cases. The ages of the patients ranged from six years to fifty-six.

Femur Cases.

Male	6 years.
Female	11 "
Female	13 "
Male	45 "
Female	56 "

Thigh Cases.

Female	24 years.
Male	49 "

Case I. *Small round-celled sarcoma of the femur, periosteal; hip-joint amputation.*—E. S., male, aged six years. No history of trauma. In February, 1898, the patient's mother

noticed a small lump in the right femur. This increased in size slowly for three months and then grew very rapidly. I first saw the patient in May, 1898, with Dr. W. R. Townsend. There was a well-marked fusiform swelling involving the lower third of the thigh and undoubtedly connected with the femur. The skin was normal in appearance and freely movable over the swelling. The joint was not involved; no enlarged glands of any size in the groin; no signs of metastasis. The general character of the tumor, with the history of rapid growth, made the diagnosis of sarcoma clear. Amputation was strongly advised. Parents refused to consent. Six weeks later I again saw the case in consultation, and at this time patient's parents consented to operation, although the tumor had increased so greatly in size that the prognosis was much more grave. Operation September 6, 1898, seven months after the tumor was first noticed. Dr. Wyeth's pins were used with greatest satisfaction; scarcely a drachm of blood was lost. The patient suffered little from shock and made an excellent recovery. Four months later the patient died of general dissemination with metastases in the lungs.

Case II. *Round-celled sarcoma of femur, periosteal; hip-joint amputation.*—J. N., aged eleven years, female. Family history good. In February, 1897, the patient fell down a flight of steps and injured the right knee; a slight swelling developed, accompanied by pain, which continued and increased. Three months later a well-marked swelling was noticed on the inside of the knee. This grew very rapidly; still the patient continued to get about. She visited various hospitals and was treated for various diseases—*e. g.*, tuberculosis and syphilis. She came under my observation on July 28, 1897, five months after the injury. At this time the clinical diagnosis of periosteal sarcoma was beyond question. The circumference of the left femur over the most prominent part of the tumor was six inches greater than that of the opposite side. Hip-joint operation was immediately performed at the Post-graduate Hospital, with the assistance of Wyeth's pins. The patient suffered very little from shock

and made an uninterrupted recovery. She returned to her home in New Jersey, and has since been lost sight of, although the utmost efforts were made to trace the subsequent history.

Case III. *Osteochondrosarcoma of the lower end of the femur; hip-joint amputation.*—L. Z., aged thirteen years, female, admitted to the New York Cancer Hospital May 30, 1898. Family history good. There was no history of trauma. Intermittent pains in the lower end of the femur were the first symptoms; supposed to be an attack of rheumatism. Shortly afterward a small swelling was noticed in the region of the pain. No interference with the movements of the joint, the swelling being situated just above the condyle. The patient was referred to me by Dr. W. R. Townsend in May, 1898. Although the patient was at that time under treatment for possible specific disease, the diagnosis of sarcoma of the femur was made, and amputation at the hip-joint advised. The family seriously objected to so severe an operation and only consented after a small portion of the tumor had been removed by a Mixter punch, under cocaine, and proved to be chondrosarcoma by a microscopic examination. Amputation of the hip-joint was performed in June, 1898, less than six months from the time the disease was first noticed. Wyeth's method was used also in this case. The patient lost little blood and made an excellent recovery. She remained perfectly well for nearly one year, when she began to fail in health, losing in weight and slowly becoming cachectic. There was no local return of the disease, but evidently generalization in the internal organs had taken place. She continued to fail, and died in May, 1900, two years after the operation.

Case IV. *Osteosarcoma of femur, traumatic; hip-joint amputation.*—T. B., male, aged forty-five years, blacksmith. Family history good. January 29, 1900, he received a fracture of the lower end of the left femur from the kick of a horse. The fracture was a simple one and was treated with extension and weights for six weeks, with apparently good

union. Two to three months later the patient noticed what he thought was an unusual enlargement at the site of the fracture. This was regarded as callus by the physician attending him. It, however, slowly increased in size and finally became painful. The patient came under my observation on August 21, 1900. At this time examination showed the lower end of the femur the site of a tumor the size of a child's head, with smooth outlines, firmly fixed to the bone; joint not involved; skin freely movable and normal in appearance. The tumor was firm in consistence. The diagnosis of sarcoma was made and amputation at the hip-joint advised. This was performed on August 29, 1900. I made use of Wyeth's method with most satisfactory result. The patient made an uninterrupted recovery, but six months later returned with unmistakable evidence of metastases in the lung; he continued to grow worse, and died within a year.

Case V. *Sarcoma of the femur, periosteal; hip-joint amputation.*—Mrs. D., aged fifty-six years. Good family history. No previous trauma. The patient first noticed a hard lump in about the middle of the left thigh at the end of 1900. She is not sure whether the tumor was movable or not. About one and a half years ago the growth was removed at the Mt. Sinai Hospital. It recurred about six months later. The patient was admitted to the General Memorial Hospital in January, 1903, and at this time there was a large tumor occupying the anterior aspect of the upper portion of the left thigh. The tumor was in two sections, nearly coalescing at the base, the lower portion being about the size of a fist, the upper considerably larger, slightly movable, and apparently attached to the periosteum; the skin was normal. The patient was treated with the mixed toxins and *x*-ray for three months without any appreciable effect upon the size of the tumor. She returned to her home, and in October the tumor had increased considerably in size and extended to and beyond Poupart's ligament. Her general condition was bad; she was markedly anæmic and had lost considerable weight. Pulse was rapid, 120, and weak. In view of the fact that the

tumor extended so high up and her general condition was so bad, the prognosis after hip-joint amputation was considered very grave and operation was not at all urged. After a consultation with several surgeons it was, however, decided to operate, and hip-joint amputation was performed on October 20, 1903. Preliminary ligature of the external iliac was done, and amputation performed with almost no loss of blood. The wound was closed by a long posterior flap. The patient made an excellent recovery, with exception of some sloughing of the distal portion of the long flap.

CASE VI. *Spindle-celled sarcoma of the thigh; hip-joint amputation.*—M. L., female, aged twenty-four years. Family history good. For some years she worked many hours a day at a sewing machine, during which time her right thigh rested upon the edge of a hard chair. In the fall of 1898 she noticed a hard lump, apparently in the muscles of the right thigh, just at the point where the thigh had rested upon the chair. This lump grew rather rapidly, and she was operated upon by Dr. Bull at the New York Hospital on December 29, 1898, two to three months after the tumor had first been noticed. Microscopic examination showed the growth to be a mixed-celled sarcoma, spindle and round. The tumor recurred quickly after operation and the patient was referred to me by Dr. Bull on January 25, 1899, with a diffuse local recurrence, three by five inches in diameter. She was put on the treatment with mixed toxins, with the result that the tumor and induration entirely disappeared. It, however, soon returned and again began to increase in size, in spite of continued treatment with the toxins. I advised amputation at the hip-joint, and performed the operation in September, 1899. Wyeth's pins were used. The patient suffered very little from shock and made an excellent recovery. No further treatment with the toxins was given after the operation. The patient remains well up to the present time, over four years since operation.

CASE VII. *Spindle-celled sarcoma of the left thigh; hip-joint amputation.*—W. V., male, aged forty-nine years.

Mother died of cancer of the uterus twenty-five years ago. The tumor was first noticed in the anterior portion of the left thigh in the summer of 1896. No history of trauma. The tumor gradually increased in size. On August 31, 1897, an extensive operation was performed by Dr. J. D. Bloom in New Orleans. Microscopic examination showed it to be a spindle-celled sarcoma. The tumor recurred in May, 1898, nine months after the operation. The patient was referred to me by Dr. Bloom for the toxin treatment, which was tried very thoroughly from July to October, 1898. At first there was marked improvement and considerable diminution in size. Improvement then ceased, and after remaining stationary for a time the growth began to increase again. High amputation at the hip-joint by Wyeth's method was done in May, 1898. The patient remained well until the summer of 1900, when he had a recurrence, which proved fatal in the latter part of 1900, two and a half years after the hip-joint amputation. The entire duration of the disease in this case was about four years.

METHOD OF OPERATION IN HIP-JOINT AMPUTATION.

Wyeth's method of wire pins was used in all but the fifth case, in which the tumor extended up to Poupart's ligament, making it impossible to use the pins. In this case I first tied the external iliac artery above Poupart's ligament and then disarticulated. No anterior flap could be made, and it was necessary to depend upon a long posterior flap. The patient, though fifty-six years of age and very weak and anæmic, stood the operation very well and suffered a minimum of shock. She lost practically no blood at the operation and made an excellent recovery. A portion of the long flap sloughed, but did not become infected. The time of operation in this case was about thirty-five minutes, not materially different from the length of time required when Wyeth's pins were used. One advantage noticed in this case was the

absence of oozing, so often seen when the thigh has been tightly constricted by rubber tubes or bandages.

In addition to the foregoing 7 cases of hip-joint or high amputation, I have done 4 amputations below the trochanter, as follows:

Case I. *Periosteal round-celled sarcoma of the lower end of the femur.*—Mrs. S. R., aged twenty-six years. Family history good. Well until the spring of 1895, when she fell and dislocated the right patella. The knee remained more or less stiff after that. Several futile attempts were made to break up the adhesions under ether. In December, 1896, a swelling was noticed on the inner side of the thigh just above the condyle, accompanied by slight pain. The tumor increased slowly in size, and two months later an exploratory incision was made by Dr. George A. Plimpton, under ether, and a portion of the tumor removed for microscopic examination. The latter was made by Dr. H. T. Brooks, of the Post-graduate Hospital, and showed the growth to be a mixed-celled sarcoma, very rich in cells and apparently highly malignant. A specimen was also examined by Dr. B. H. Buxton, of the Loomis Laboratory, who pronounced it to be alveolar sarcoma, composed principally of round cells, very malignant.

In April, 1897, the patient was referred to my service at the General Memorial Hospital, at which time the exploratory incision had not yet healed, and there was free discharge of pus coming from the bottom of the wound; there were several enlarged glands in the groin. One of these was removed under cocaine, and proved to be nothing but hyperplasia.

On April 5, 1897, amputation at the middle of the thigh was performed and all the glands in the groin were removed. Examination showed them not to be involved. Examination of the tumor showed it to be of periosteal origin, the central portion of the bone not being invaded. There was considerable suppuration in the end of the stump, but as the leg was infected at the time of operation, this was not surprising.

The patient made a good recovery, but died four months later of internal metastasis, chiefly in the lungs.

Case II. *Melanotic round-celled sarcoma of the thigh; amputation just below the trochanter.*—Mr. W., aged fifty-five years. Good family history. No specific or tuberculous history; for a number of years had a small, pigmented mole on the inner aspect of the right thigh just above the knee. In January, 1901, the mole became irritated by his clothing and occasionally bled. Shortly afterward it began to slowly increase in size. A few weeks later he noticed enlarged nodules in the groin, but little attention was paid to them. They increased gradually in size, and early in July a mass of glands, the largest the size of a goose-egg, was removed from the groin by his physician, Dr. Stuart, of Pittsburg. Macroscopic as well as microscopic examination showed the mass to be typical melanotic, round-celled sarcoma. Two smaller masses removed from the inner aspect of the thigh, about midway between knee and groin, showed the same type of growth. In July the patient was referred to me by Dr. Stuart for the toxin treatment, and from July to October received daily injections of the mixed toxins. At the time the treatment was begun there were numerous small nodules, varying from the size of a No. 8 shot to that of a split pea, almost entirely encircling the lower portion of the thigh just above the knee and scattered about the various areas nearly up to the groin. At first there was some decrease in the size of the small tumors, but later they began to increase in size and in number. The patient also began to lose flesh and appetite. On October 10th, after consultation with Drs. Bull, Bryant, and Hartley, it was decided to amputate just below the hip, not with any hope of getting rid of the trouble, but expecting that, by taking away the largest focus of the disease, the end might be more comfortable. Amputation just below the trochanter was done, Wyeth's pins being used. The patient made a good recovery and gained considerably in weight until the latter part of November, when a small tumor appeared in the skin of the abdomen. The patient

again began to lose flesh and weight and showed evidence of general metastases. His condition became worse rapidly, and he died four months later.

Case III. *Sarcoma of the femur; amputation just below the trochanter.*—Mr. I. N. S., aged forty-one years, was referred to me on June 28, 1899, for sarcoma in the middle of the right thigh. The patient was a large, powerfully built man, six feet tall, weighing about 200 pounds; he had been in perfect health up to a few months prior to this time. There was no history of trauma. Physical examination showed a fusiform swelling, deeply seated, apparently attached to the bone, but not a part of it; not movable. I made an incision under ether and found a tumor of about the size of a goose-egg, situated beneath the muscles, apparently arising from the periosteum; it did not involve the bone proper and was easily separated from the femur. All the tumor tissue was apparently removed, and the patient was put upon the toxins to prevent a recurrence, if possible. However, in September, 1899, there was unmistakable evidence of a local return, and on October 3, 1899, I performed amputation just below the trochanter, making use of Wyeth's pins. The wound healed by primary union, and the patient made an excellent recovery. The toxins were given after he returned to his home in New Orleans, and he remained fairly well for about a year. In December, 1900, there was a recurrence in the stump and in the sciatic nerve. For this further amputation was performed, with disarticulation of the small fragment of bone remaining from the first operation, by Dr. Bloom, of New Orleans. The patient remained well and had no local recurrence, but in May, 1902, I received a letter from Dr. Bloom, stating that the patient was confined to his bed with left pleural metastases. He died shortly after this. The entire duration of life since the beginning of the disease was three and a half years.

Case IV. *Spindle-celled sarcoma of the thigh; recurrent, after primary sarcoma of the metatarsal bone; amputation just below the trochanter.*—F. K., female, aged sixteen years, had a fall in 1888, injuring her right foot. Shortly afterward two

lumps appeared at the site of the injury. The following year the tumors were removed by Dr. William T. Bull, at the New York Hospital, with excision of the third and fourth metatarsal bones. She remained well for three years after that, when she received another injury to the foot, followed by local recurrence. Syme's amputation was performed by Dr. Bull. In 1893 she fell down stairs, again injuring the stump, and almost immediately afterward a tumor appeared on the site of the injury; this slowly increased in size; shortly after this a large tumor, the size of a child's head, developed in the popliteal space. This was removed in 1894 by Dr. Bull. Microscopic examination of all these growths showed them to be spindle-celled sarcoma. At the time the popliteal tumor was removed the small tumor in the stump was left behind and treated with the mixed toxins, with the result that it entirely disappeared. About one and a half years later there was a local return and also a return in the lower part of the thigh, for which I performed high amputation just below the trochanter in 1896. Shortly after there was an extensive recurrence in the gluteal region, which was partially removed by operation, and the patient was put upon the mixed toxin treatment, which was kept up at intervals for three years.

I examined the patient in June, 1903, and, as she was very anxious to get a false leg, I decided to remove the small tumor that had remained since the last operation and shown no tendency to increase in size. This was believed to be merely fibrous tissue, and such it proved to be on examination after removal. The patient is in perfect health at present, nine years since the beginning of the treatment and seven years after the last operation.

The question of the curability of sarcoma of the femur by operation is one that is still more or less unsettled. Butlin, in his well-known book upon sarcoma, states that of 68 cases treated by hip-joint or high amputation, only 1 was known to be alive more than three years. Wyeth,[1] who made the

[1] Annals of Surgery, 1901, vol. i. p. 375.

most complete collection of cases in 1901, found that, in 131 cases of sarcoma of femur treated by amputation through the hip-joint, only 10 were well beyond three years.

My own observation bears out the opinion that sarcoma in this locality is one of the most malignant forms of tumors with which we have to deal.

Of my 5 cases of sarcoma of the femur treated by hip-joint amputation, 2 died within a year, 1 lived two years, 1 was not traced, and the last, a recent case, is the only one in which the patient is known to be alive.

The 4 cases of sarcoma treated by high amputation just below the trochanter, 1 a sarcoma of the femur, died four months afterward of lung metastases. The second, likewise a sarcoma of the femur, had a local recurrence at the end of one and a quarter years; disarticulation was then performed and the patient lived for one year longer, when he died of generalization of the disease. The third case in which amputation below the trochanter was performed was a multiple melanotic sarcoma of the skin of the thigh, which died four months later of generalization and internal metastases. The fourth case was a recurrent sarcoma of the thigh, primary in the tarsus. There was a local return in the gluteal region, which disappeared under the use of the mixed toxins. The patient is alive and well at present, six years after amputation.

The cure of sarcoma of the femur by high amputation is so rare that every success should be reported.

The only successful cases that have come within my immediate knowledge are the following, six in number:

CASE I. *Osteosarcoma of the femur; amputation at the hip-joint, by Dr. William T. Bull, at the New York Hospital.*—Amputation was done sixteen years ago. The patient contracted septic infection of the stump. There was continued high temperature, probably streptococcus infection, from which, however, he recovered, and was well six years afterward.

CASE II. *Sarcoma of the femur; amputation at the hip-joint, by Dr. W. L. Robinson, of Danville, Va.*—The patient was

put upon a course of the mixed toxins immediately after the operation. He remained well for more than three years, when he developed a recurrence in the iliac fossa, which broke down and disappeared under the resumption of the toxins. When last heard from the patient was in good health.[1]

Case III. *Periosteal sarcoma of the lower end of the femur; amputation at the hip-joint, by Dr. J. D. Rushmore, of Brooklyn.*—The operation was done six years ago and the patient was well when last heard from, over five years after operation.

Case IV. *Inoperable giant-celled sarcoma of the femur; disappearance under mixed toxin treatment, in service of Dr. A. Gerster, of New York.*—The microscopic examination was confirmed by Professor T. M. Prudden, but the case was considered too far advanced by Dr. Gerster for hip-joint amputation. The mixed toxins were, therefore, decided upon, and, after prolonged treatment at the Montefiore Home for Incurables, the tumor disappeared. The patient was exhibited before the New York Surgical Society in November, 1903, by Dr. John Rogers, more than four years after the treatment. The patient was in perfect health, and there was no sign of either local or general recurrence.

Case V. *Osteosarcoma of the lower end of the femur; amputation at the hip-joint, by Dr. D. Hayes Agnew, of Philadelphia.*—The patient, a prominent physician of Philadelphia, is alive and well to-day, sixteen years after amputation.

Case VI.[2] *Periosteal sarcoma of the femur; amputation at the hip-joint, by Dr. George W. Shrady, of New York.*—The patient is alive to-day, twenty-one years after amputation.

It is interesting to note that in 1 of these 6 cases no amputation was done, as the disease was considered too far advanced for amputation by Dr. Gerster, and the patient was treated for some months with the mixed toxins of erysipelas and bacillus prodigiosus, with the result that the tumor finally disappeared, and the patient is at present quite well, with

[1] This patient finally died of further recurrence.

[2] An unpublished case communicated to me by Dr. Shrady.

perfect use of the leg, five years afterward. In this case the diagnosis was made by Dr. Mandlebaum, Pathologist to the Mt. Sinai Hospital, and confirmed by Dr. T. Mitchell Prudden, of the College of Physicians and Surgeons.

In another case (Dr. Bull's), in 1886, the patient had severe septic infection following operation, with continued high temperature for some time. In this case there was probably a streptococcus infection, which, I believe, had much to do in destroying any sarcomatous cells that might have been left behind and caused a recurrence. It is worthy of special note that also in 1 of my own cases of sarcoma of the thigh (the patient, who is still alive, more than four years after operation), the mixed toxins were used for several months prior to amputation.

I believe the malignancy in this case was much modified by the toxins, and hence recurrence was prevented.

In the discussion of Dr. Wyeth's paper on "Hip-joint Amputation for Sarcoma," at the Philadelphia Academy of Surgery, in 1901,[1] I stated that the end results of operation for sarcoma of the femur and of the long bones in general in the preantiseptic days, as shown in the classical paper of Gross,[2] were much superior to those obtained to-day. The explanation that I then offered, and the only one that seems plausible, is that the streptococcus infection that not infrequently occurred in the earlier period destroyed the sarcoma cells that were left behind and prevented a recurrence.

If this be the true explanation, we have rational ground for advising a thorough course of erysipelas toxin treatment as a prophylactic after all cases of primary amputation. The prophylactic value of the mixed toxins is proved by the case of Dr. Robinson and by several of my own cases. In one case I removed under cocaine a tumor of the finger. The clinical diagnosis was uncertain, but the microscopic diagnosis by Professor William H. Welch and three other path-

[1] Annals of Surgery, vol. xxxiv. p. 597.

[2] American Journal of the Medical Sciences, 1879.

ologists proved it to be a mixed-celled sarcoma of periosteal origin. The question of the removal of the finger was carefully discussed, as it was practically certain that some of the diseased tissue had been left behind. It was finally decided to put the patient upon a course of toxin treatment, which was continued with intervals for more than a year. The patient is still well and free from a return, more than three and a half years later.

To return to the question of operation for sarcoma of the femur, there is a difference of opinion as to what is the best method. While the weight of surgical opinion has long been in favor of high amputation or amputation through the hip-joint, at the discussion in Philadelphia referred to Dr. Bloodgood, of Baltimore, spoke in favor of resection of the bone instead of amputation, and cited the experience of Mikulicz[1] in support of this view.

I have carefully gone over the cases reported by Mikulicz, and I do not believe they warrant us in giving up amputation.

Mikulicz refers to 1 case of von Bergmann of resection of 15 cm. of tibia and fibula. The patient recovered, with very fair use of his leg. As to the later history of this case nothing is stated.

One case of Bramann, of resection of 10 cm. of the head of the tibia for myeloid sarcoma, with patient well three years later.

Mikulicz's own cases of resection of long bones for sarcoma were 7 in number: 2 of the radius; time of observation, one and a half years in 1, four months in the other case. One of ulna, well two months since operation. One of tibia, well six months. Two cases of spindle-celled sarcoma of femur, periosteal.

1. Resection of 20 cm.; patient well; can walk without cane; over a year after resection.

2. Resection of 20 cm. for periosteal spindle-celled sarcoma of femur. Resection unsatisfactory to patient and amputa-

[1] Arch. f. klin. Chir., Band l., S. 660.

tion preferred five months later. (Amputated leg shows no trace of recurrence; at both bony ends copious new formations of bone.)

Mikulicz's concluding remarks are briefly as follows: "In view of the foregoing, I can recommend to you in future to try resection instead of amputation in malignant diseases of the long bones, of course, with the necessary limitations and precaution." He further mentions, as an important advantage of resection over amputation, the fact that patients may be easily persuaded to have such an operation done at a time when they would refuse amputation, which, when finally consented to, may be too late.

While the cases reported by Mikulicz may prove that it is possible to resect the femur in many cases of sarcoma and in some instances to give the patient a fairly useful limb, they are very far from proving that the patients can be cured of the disease by such an operation.

The procedure advocated by Mikulicz might, perhaps, be worthy of a trial in slowly growing myeloid sarcoma of the tibia, the radius, and ulna, but to extend it to periosteal sarcoma of the femur, I believe, it would be most unwise. In the latter case the disease is so highly malignant and extends so far beyond the macroscopic limits that it would be almost impossible to be sure of its entire removal by resection.

One of the cases of sarcoma of the lower end of the femur cited above, in which Dr. Bull performed hip-joint amputation, the bone at first was sawed through about six inches below the trochanter; then, feeling doubt lest the disease had extended higher, disarticulation was performed. A careful examination of the upper end of the bone was made by Dr. B. H. Buxton, and it was found that the sarcoma cells had extended upward to the head of the bone, although the gross appearance was normal.

In such cases resection would prove of little value.

The chief danger in sarcoma of the femur lies in the remarkable tendency to early metastasis. This is especially true of periosteal growths. In many cases, I believe, a generaliza-

tion of the disease has already taken place before the operation. Hence the importance of making a very careful physical examination of the entire body, especially of the lungs. It is often recommended to make an exploratory incision into the tumor prior to an operation for the sake of diagnosis. This custom I believe to be attended with grave peril to the patient. Such incisions into sarcoma of any locality may cause the infectious sarcoma cells to enter the blood current and be carried to remote parts of the body to be the starting point of metastatic tumors. In sarcoma of the femur the risk is, I believe, especially grave. In none of my own cases have I felt the necessity of such exploratory incisions, and I believe that a careful history of the case and a careful physical examination of the tumor will almost invariably make the diagnosis clear. In cases of doubt I would have the patient prepare for operation, an Esmarch bandage applied, ready for amputation, and then cut into the tumor. The gross appearance will, as a rule, dissipate the doubts, but if not a frozen section can be examined.

THE VALUE AND PLACE OF THE *x*-RAY OR TOXINS IN SARCOMA OF THE FEMUR.

An important question comes up as to the propriety of trying the *x*-rays or toxins before advising such a serious operation as hip-joint amputation.

Personally, I do not think we are justified in allowing the patient to run the risk of a generalization of the disease, which may easily take place during the few weeks necessary to determine the success or failure of such treatment. I, for my part, have never advocated the use of the toxins in sarcoma of the femur, always advising immediate amputation, and yet, in sarcoma of other long bones, I think a preliminary course of toxin treatment might be justifiable. In support of this opinion, I would cite a case of recurrent sarcoma of the tibia, in which microscopic examination was made and the diagnosis confirmed by Professor John Caven, of the

University of Toronto. In this case, before amputating, I treated the patient for three months with the mixed toxins in large doses, with the result that the large tumor entirely disappeared. The patient is to-day in perfect health, working on a farm in Canada, six years after treatment.

In regard to the *x*-ray, we are not justified with our present knowledge in believing an osteosarcoma of any kind, much less a sarcoma of such rapid growth and high malignancy as sarcoma of the femur, can be permanently cured with the *x*-rays. On the other hand, it would be unfair and unscientific not to mention the remarkable result obtained by myself in one case of sarcoma of the femur, in which the *x*-rays were begun in February, 1902, after the patient and his family had absolutely refused considering an operation. In this case almost two-thirds of the lower end of the left femur were occupied by a typical round-celled sarcoma of rapid growth.

The diagnosis was confirmed by microscopic examination. The patient has had almost continuous *x*-ray treatment from February, 1902, to the present time. After a few months the circumference of the left leg became practically normal, and the patient regained his normal weight. At the end of nearly a year he developed extensive metastasis in the left pectoral region, which was partially removed by operation and afterward treated with the *x*-ray. A little later, or one year ago, he developed a very large metastatic tumor in the right lumbar region, filling up a good part of the iliac fossa. The patient was put upon large doses of the mixed erysipelas and bacillus prodigiosus toxins in addition to the *x*-ray, with the result that the lumbar tumor broke down and was evacuated through a posterior incision. At present, December 4, 1903, the patient weighs 106 pounds and his general condition is good. There is still some thickening of the left femur; the sinus remains open and there is slight discharge. There is no recurrence apparent either in the pectoral or lumbar region. Nearly two years have elapsed since the *x*-ray treatment was begun and one year since the

toxins were added. He is at present taking the *x*-ray three times a week.

In this case it is impossible to deny that the *x*-ray alone and unaided almost destroyed the primary local sarcoma in the femur. It, however, did not prevent, and possibly may have aided generalization of the disease in the formation of metastases referred to. Although the boy's present condition is fairly good, we cannot regard him as a case of cure, and in all probability further metastases will occur and prove fatal.

CONCLUSIONS.

1. Sarcoma of the femur is a malady so dangerous to life, so prone to early metastasis, that only the most radical operation should be performed, and that at the earliest possible moment.

2. Hip-joint amputation is to be preferred to resection or to amputation through the shaft.

3. Recurrence being the almost invariable rule after all methods of operation, a thorough course of mixed toxin treatment after operation, as a prophylactic, offers the best hope of permanent cure.

DISCUSSION.

Dr. W. L. Robinson, of Danville, Va.—The case operated on by Dr. Wyeth was one of extensive sarcoma of the hip in which he could not remove all of the diseased tissue, and the patient returned to me. I used the mixed toxins, and in the course of three months healing occurred. The patient remained well for almost three years, when the disease recurred, with considerable suppuration. I used the toxins again; the patient recovered and continued his business for six months. The disease again recurred, and he had a long fight for his life, but finally died.

If you will allow me, I will mention the use of the toxins in other cases which were of some benefit. One was a case of sarcoma of the tibia. The whole tibia was removed, and probably one-half of the periosteum excised. The toxins were persisted in in this case for eight months. The patient has gone seven years without a recurrence, and, so far as I know, is perfectly well. Microscopic examination showed it to be a giant-celled sarcoma.

A little over three years ago a young man came to me with sarcoma of the testicle. I removed it, and in less than five weeks the vas deferens became involved on the other side. I took the patient to New York, and Dr. Bodine wanted to remove the testicle and make a clean sweep, deeming it imperative. The glands were involved. I took the patient home, removed the vas deferens, used the toxins for eight months, and he has been perfectly well since.

Dr. Maurice H. Richardson, of Boston.—I have had four cases of sarcoma of the femur. In all of them early and fatal recurrence followed a brilliant amputation at the hip-joint.

Dr. J. Shelton Horsley, of Richmond, Va.—I have had one case of amputation of the hip-joint for sarcoma which recovered from the operation, but died six months later from metastasis in the lung. When I was assistant to Dr. Wyeth, he was certainly quite successful in treating these cases of sarcoma surgically. At the time I left him six years ago, I think he had operated on seven cases, and there was only one death among them. Dr. Coley's statistics are an improvement on those of Dr. Wyeth. Reduction in the mortality rate from Wyeth's method has been very marked. In the older text-books, and in Ashhurst's System, the mortality is given as being over 50 per cent. The causes of death may be said to be hemorrhage, shock, and sepsis. The chief cause of death was found to be hemorrhage and not sepsis, and shock would be about the same during the preantiseptic period and at the present time. It can be readily seen that the reduction in mortality has been mainly due to the method and not to the improvement in aseptic technique.

There is one other thing that Dr. Crile has suggested which might accomplish a great deal toward eliminating shock, and that is, in amputating the hip-joint the largest nerve of the body is divided and several smaller nerves. Now, it is a comparatively simple matter to cut down upon the greater sciatic and inject cocaine into the substance of the nerve before cutting it. If that is done with the greater sciatic and anterior crural nerves it will largely eliminate shock.

Dr. W. O. Roberts, of Louisville.—I would like to ask Dr. Coley whether he has had any experience in controlling hemorrhage according to the McBurney method. I have seen McBurney operate a number of times and control hemorrhage perfectly by making an incision in the abdominal wall and producing direct compression of the arteries there.

Dr. Coley (closing).—I have had no experience with the McBurney method, because, it seems to me, an addition to the gravity of the operation that is entirely unnecessary. I have never had the slightest difficulty with Wyeth's method, and I have only words of the highest commendation for it. There is one point in the technique which I did not follow out completely, and that

is the leaving of the Esmarch bandage on until the dressing is applied. I am certain that one case would have died had I so done, because the vessels not ligated were of sufficient size to produce a profuse hemorrhage which would have been fatal had I adopted that procedure. After I have tied all the vessels visible, I remove the Esmarch bandage and tie those that appear. In this way there is a minimum of shock.

Regarding Dr. Robinson's case of sarcoma of the testis, I must congratulate him on the result, because my own experience of twenty cases has been that I have never seen one cured by operation or any other method.

THE DIAGNOSIS AND TREATMENT OF GALL-STONES.

By Mack Rogers, M.D.,
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The condition known as cholelithiasis, biliary calculi, or gallstones is one where we have the formation of solid concretions in the gall-bladder, bile-ducts, or possibly in the liver substance.

This paper will not take up the general history, etiology, pathology, formation, classification, etc., of gallstones, but will deal only with the diagnosis and treatment of them.

The condition is either acute or chronic, or we may have an acute attack superadded to a chronic one.

In the acute attack we find the patient suffering from an excruciating pain referred to the region of the gall-bladder; this pain comes on suddenly and is paroxysmal in type, and radiates to the epigastric region, the umbilicus, or back to the point of the right shoulder-blade. It is stubborn and does not yield readily to moist heat or internal medication. It may last for a few minutes only or continue for hours or even days, in spite of opiates.

Pressure over the gall-bladder during an attack of colic always elicits local tenderness and increases the intensity of the local and referred pain.

The pain is intense while the stone is traversing the cystic duct, and suddenly becomes less severe when the concretion has either dropped back into the gall-bladder or entered the common duct. Should this pain continue and jaundice ensue, the stone is evidently obstructing the common duct;

but if the pain is suddenly relieved, it is highly probable the stone has passed into the duodenum. If the stone has entered the bowel, the attack is ended, and the jaundice soon clears up. These attacks are known as hepatic or bilious colic. Ferguson, of Chicago, emphasizes the fact that we may have severe bilious colic without gallstones, and that we may have gallstones in abundance without bilious colic.

He relates cases where the signs and symptoms indicated gallstones, but the operation revealed viscid, tarry bile, occluding the neck of the gall-bladder and cystic duct. But, of course, it is just as rational to operate for the relief of such a condition as for that of stones.

Pressure over the gall-bladder excites or aggravates pain and produces or aggravates nausea and vomiting, which are always present, and are characteristic of an acute attack. The vomiting usually accompanies the pain, and the character of it is important, for if it contains bile we know it is escaping from the liver, but we should remember this may occur along the normal ducts or by a biliary fistula leading from the gall-bladder or bile-ducts to the stomach or intestines. During the paroxysms of pain and vomiting there is usually profuse perspiration or it may come on just after an attack, and is due to the shock from the severe pain, and if often repeated rapidly produces exhaustion.

The pulse rate is usually lowered, reaching as low as 50, or even 40, per minute.

The temperature may or may not be elevated; if so, it rarely runs above 103° F., and this only in cases of gangrene or empyema of the gall-bladder or some other complication.

These symptoms may last for a short time and pass off entirely or they may continue for several days, becoming less and less intense, until they cease altogether or terminate in the chronic form. If the attack ends in the chronic form, we infer that the stone has lodged in the cystic duct or migrated down to the dilated portion of the common duct and lodged there, or that there were many concretions in the gall-bladder that are passing in rapid and continuous succession.

When the concretion lodges in the cystic duct it causes distention of the gall-bladder; but when it lodges in the common duct we do not have distention of the gall-bladder, but a stoppage of the flow of bile and its consequences, one of the most significant being jaundice. We should remember that jaundice is an evidence of a disturbance of the biliary apparatus, and when it is present we should cast about to ascertain its true cause. I am aware that some writers claim we do not have jaundice except where the hepatic or common ducts have been interfered with. I do not share in this belief, however, for I have operated on cases where jaundice was pronounced and had been for days and even weeks, and when I examined the ducts I found them potent or frequently the cystic duct occluded and the common duct open, and in such cases I have not been content to merely palpate the ducts, but have actually demonstrated that they were open by forcing water through them into the bowel.

I do not believe we can have much trouble with the biliary apparatus for more than a day or so at a time without it manifesting itself in some degree of jaundice.

In all suspicious cases we should insist on a clean, clear, and consecutive clinical history; and from this we will learn of previous attacks coming on suddenly, where the patient was seized with violent pain in the hepatic region, accompanied by vomiting, perspiration, and more or less jaundice. There have been gastrointestinal disturbances, such as indigestion, constipation, and for a few days after an attack the stools were clay-colored or did not contain bile, and if the patient is an observant one he may have detected gallstones in the feces, which, of course, is pathognomonic.

If we palpate over the gall-bladder we are able to feel the base of this distended viscus jutting down below the margin of the liver at a point corresponding to the lower border of the ninth right costal cartilage, and in some instances we are able to actually feel and hear the gallstones grate against one another. In other cases we can easily make out a mass there, but not the distinct gall-bladder. This mass is due to adhe-

sions that have formed during previous inflammatory attacks, and when we have an inflammatory attack we usually find the right rectus tense.

Blood examination is of but little value.

x-ray has been of no service yet.

Age, sex, and physical condition play important parts. It is estimated that 25 per cent. of all persons reaching forty years develop gallstones in some form. They are most frequent between forty and sixty years. Females are three times more often affected than males, and of these 90 per cent. have borne children.

Gallstones are usually found in persons of a robust build and habits, and are rarely found in thin, delicate, nervous persons.

In making a differential diagnosis we should eliminate the following diseases:

1. *Nephritic Colic.* In this the pain is referred to the back and radiates downward and forward to the groin and testicles, and in this we have certain characteristic urinary manifestations.

2. *Gastralgia.* This is characterized by flatulency, relieved by eructation, and is directly associated with the taking of food. Epigastric pressure affords relief rather than pain.

3. *Gastric Ulcer.* This is usually found in young, thin, anæmic women, and the pain is made worse by taking food and relieved when the stomach is empty, and these patients often vomit blood.

4. *Duodenal Ulcer.* This rarely occurs independent of burns or other extensive surface irritations. In them the pain is worse a few hours after meals.

5. *Diaphragmatic Hernia.* In this there is the history of violence of some kind, and the tumor and tenderness are not located in the gall-bladder region.

6. *Abdominal Aortic Aneurysm.* This is chronic; the tumor pulsates and is usually situated more on the left side.

7. *Appendicitis* is the disease with which gallstones are most frequently confounded, and when the appendix is

directed upward and lies near the gall-bladder or the gall-bladder is greatly distended and reaches down near the appendix, it is often impossible to differentiate the two before an incision is made.

I wish to repeat and emphasize the importance of diligence and care in these suspicious cases, in order that we may be able to arrive at a positive diagnosis.

This is not always easy, and especially so in the first attack, that lasts for a short time only and passes off without leaving any jaundice. However, a diagnosis can be based on sudden intense pain, tenderness and rigidity, localized over the region of the gall-bladder, accompanied by nausea, vomiting, perspiration, prostration, and often jaundice; clay-colored stools, containing gallstones; together with a distended gall-bladder or a mass in that region.

These signs and symptoms grouped together in a large, fleshy person over forty years old, and especially if a woman that has borne children, will justify a diagnosis of gallstones.

When we feel confident we have gallstones, acute or chronic, that are giving trouble of a serious character, we should not hesitate to recommend surgical intervention. This is especially true, since there are no known medicinal remedies that materially affect this condition.

You observe, I say, cases that are giving trouble; for I do not believe all cases of gallstones should be operated on, even though they are accidentally discovered, for we know that many cases are detected after death from other causes, and that the gallstones never gave any trouble during life. The operation should be determined upon by close observation of the patient.

When paroxysms come in rapid succession and with more and more severity, producing loss of flesh and strength and accompanied by jaundice, deepening after each attack, we should urge intervention. These are determining signs and symptoms that we should not allow to develop too prominently before we intercede, because in this as in other prostrating conditions the operation should be done before exhaustion

occurs. When we have determined the case as an operable one we should not permit any longer delay: the facts should be stated frankly to the patient or his friends, and in most instances they are amenable.

The operation for the removal of stones from the gall-bladder where there are no adhesions is a comparatively easy one, but when the stone is located in the common duct or extensive adhesions exist, or both, we have a very difficult condition to deal with. In the hands of competent, experienced men, I regard this as one of the safest operations in the abdominal cavity. The mortality in all cases averages only about 3 per cent.

The patient is prepared in the usual way for abdominal sections and placed on the operating table in the reversed Trendelenburg position. This allows the abdominal viscera to gravitate down out of the way and the liver and gall-bladder to come down below the costal arch, and admits of easy access to the latter.

The incision should begin at the lower border of the ninth costal cartilage on the right side and extend vertically down along the outer border of the right rectus muscle for about three inches. If this does not afford enough room, another one should be made at right angles to this from its upper extremity two inches toward the median line. This last incision should include the skin and sheath only of the rectus, but not its fibres, for they and the peritoneum can be retracted out of the way; when the fascia and peritoneum are divided, if there are no adhesions, the gall-bladder can readily be seen and palpated, particularly if it is much distended. If adhesions are present it can generally be exposed by gently separating them with the end of the finger under the eye.

A large silk ligature is passed, one on each side the fundus of the gall-bladder; these act as guy-lines to hold it up in the abdominal wound. We then palpate the under surface of the bladder and continue down along the cystic duct to the hepatic and common ducts, exploring for stones lodged there. If none are found we pack sterile gauze around the bladder

while it is held up in the abdominal wound by the guy-lines. Mayo, of Rochester, says when it cannot be brought out this way, he separates it from the under surface of the liver until he can deliver it. I have never tried this. If the gall-bladder is at all distended, we should aspirate it before we make the incision.

The incision should now be made between the guy-lines, and while the margins of the cyst wound are held in apposition with the parietal peritoneum we stitch it there by a few silk sutures passed through the cyst walls and coming out through the abdominal muscles, but not the skin. These are carried around the upper margin and sides of the opening, but not around its lower margin. We leave this until we close the abdominal wound.

Now, while the assistant makes the traction on the guy-lines to relieve the sutures that have just been put in, we proceed to remove the stones. This is done best by means of a scoop, shaped something like a large, dull curette, bent at an obtuse angle near the bowl. This will be serviceable to remove the small and medium-sized stones, but the fingers and forceps must be used in removing the large ones. Or the stone may be so large as to require the complete opening of the gall-bladder wall, and in such case it is sometimes best to do cholecystectomy, or complete removal of the gall-bladder. This is desirable where a very great part of the cyst wall must be divided, because in these cases we do not get good drainage and the function of the bladder has been destroyed. However, I do not think routine cholecystectomy good surgery. When we feel certain we have removed the last concretion, we should use an aspirator with a soft-rubber tube attached and force water down into the neck of the gall-bladder, and if the ducts are open on through them into the duodenum, or if there are gallsands left in the neck of the bladder they may be sucked out.

Just here I wish to call attention to the sacculated condition of the gall-bladder I operated on. If we remember, the mucous membrane of the gall-bladder is arranged in folds

or rugæ, which normally causes depressions or sulci between them; but in this case these depressions were exaggerated and amounted to pockets or sacs, and as there were nearly a hundred stones in it I was a long time chasing them from one pocket to another before I could feel satisfied I had the last one. This was the most decidedly sacculated condition I have ever met, and, so far as I know, the only one reported.

When we are sure the bladder is clear and the ducts open, we insert a large drainage-tube down into the gall-bladder, but not into its neck, because the tube will produce paroxysms similar to those before the operation if it is crowded down into the narrow part of the neck.

The tube is held into position by passing a large silk suture through it and the skin, allowing the tube to project one-half or one inch beyond the skin.

The gauze around the gall-bladder is now removed and a small, narrow strip of fresh gauze is placed just under the gall-bladder and allowed to come out through the skin. This is to catch any leakage that might occur.

The peritoneum is now closed tight around the gall-bladder and a strip of gauze drain by a fine, continuous catgut suture.

The muscular layer is now closed by large, interrupted catgut sutures, and, finally, the skin is closed up snug around the gauze drain by silkworm-gut sutures. The last suture next to the drain is put in place, but not tied. We now apply a large gauze and cotton dressing and retain it in place by adhesive straps and a many-tailed binder.

The amount of drainage from these cases is astonishing, so we usually arrange a large, heavy layer of cotton, external to the adhesive straps, that may be changed without disturbing the inside dressing.

At the end of the second or third day we change the dressings, remove the gauze drain, and bring the wound together by this stitch that has been previously put in place. This brings the abdominal wound snug up around the drainage-tube, and we have perfect drainage from the gall-bladder.

This drainage-tube should be permitted to remain until the gall-bladder is healthy and the bile is sterile.

The biliary fistula sometimes closes promptly after the removal of the drainage-tube—say, in a week or ten days—while in other cases they remain open weeks and even months, and ultimately we are forced to close them.

DISCUSSION.

Dr. Maurice H. Richardson, of Boston.—Since 1886 I have been very much interested in gall-bladder work, and I welcome papers upon this subject.

With reference to cholecystectomy, I have performed this operation a good many times in the last year. I was convinced in a paper that I read at the Cincinnati meeting that it is a good thing to take out the gall-bladder much more frequently than I had been doing. I find now, after extirpating the gall-bladder, many inexplicable complications.

As to the diagnosis of gallstones I will say that it is in typical cases easy. When the case is atypical, the diagnosis is at best only a guess.

In most cases we do not really know very much about the symptoms of gallstones, nor do we know the cause of the symptoms. This is especially true when the stones are beginning to cause trouble. I believe that many cases of so-called indigestion are caused by gallstones, and the reason I think so is because digestive symptoms alone exist in patients who undoubtedly have them, as shown in the course of abdominal operations for other lesions. In such cases we have a splendid opportunity to study the subject. We can now intelligently question a patient who is known to have a gall-bladder filled with stones, and we can infer a reasonable connection between a known lesion and well-observed symptoms. How many people are there who have not had at one time or another pain which has been usually attributed to indiscretion in diet? I am convinced that in many of these cases the indigestion or gastric pain may be due to gallstones. Not that I would operate for gallstones every time that a patient has indigestion; but persistent and disabling dyspeptic pains should at least suggest the possibility of a gallstone cause. I go much farther than usual in my advocacy of removing gallstones by saying that I do not think we ought to wait too long when gallstones are strongly suspected. I hesitated to make this last statement until one of the most prominent physicians in this country told me he believed that when we know a man has gallstones they should be removed.

This physician, I am happy to say, has just undergone a successful operation himself for gallstones. This is a case in which the physician is far ahead of the surgeon. If you are strongly suspicious that a patient has gallstones, I believe it is a good plan to explore the gall-bladder. It certainly can be done without any considerable danger. I do not believe in removing gallstones at the end of a serious operation like hysterectomy.

The field of gall-bladder surgery is a prolific and interesting one. In the good that may be accomplished by early exploration, especially in long-standing disabilities, the right upper quadrant has most attractive and brilliant possibilities.

Dr. J. Garland Sherrill, of Louisville.—I was very glad to hear Dr. Richardson say that there are cases coming up every day in gall-bladder surgery for which we have no precedent. I remember a case that came under my care about six months ago. The patient was a woman, markedly jaundiced, who had for six months previously been suffering, and at the time I saw her had a large tumor in the abdomen extending down nearly to the level of the anterior superior spine. The question of malignancy was considered, but the shape of the tumor led us to think that it might be an enlarged gall-bladder. Operation revealed a dilated gall-bladder filled with mucus, tinged slightly with bile color. A large number of small stones and one large one from the common duct were removed. The gall-bladder was drained. I was unable to establish clearly in my mind the potency of the common duct. For a time the patient discharged a little greenish-colored fluid, which I could scarcely say was bile. After a time the opening closed, the jaundice diminished slowly, but persisted, and the patient held her own for a while, when she began to fail. During the past week I finally decided to give her a chance by doing something. I did not know what I was going to do until I entered the abdomen. Upon opening the abdomen the gall-bladder was found to be small, and to contain a very small quantity of fluid, which escaped through the common duct, showing that portion of the canal was patulous. At the site of the old stone (large stone) and involving the hepatic duct in proximity there was a nodule which I am fully convinced was malignant. An effort to make an opening in the duct at that point resulted in failure to obtain a flow of bile; the patient died two days later. Post-mortem examination revealed a nodule at this point and marked infiltration, indicating the presence of a cancer of the liver and ducts above the gall-bladder. This accounted for the absence of bile in the gall-bladder as well as for my failure to relieve the patient.

This case is an argument for operation in gallstones. This woman must have had gallstones for a long time before any symptoms developed. She did not give a history of the ordinary gallstone colic.

Dr. I. S. Stone, of Washington, D. C.—What few remarks I have to make will be along the lines of the diagnosis. I have given patients relief mostly in those cases where large stones have been found. We sometimes have patients who complain of vomiting and a certain amount of pain, sufficient to attract the attention of physicians to the gall-bladder, even when we could not find the gall-bladder enlarged, when there was no history of jaundice, nothing to attract the attention in a stereotyped way. Nevertheless, the physicians have done what they could and then surgeons have been called in. An operation has been done, based upon the clinical manifestations and guesswork, in the hope that operation would afford relief. I recall a case in which, at first, two stones were removed, and by drainage removing a third about the size of a small pea, three-sixteenths of an inch in diameter. The relief in this case was remarkable, the operation having been done five or six years ago. The patient had pain for years before that, but she has not had pain in that locality since, nor vomiting, nor any of the symptoms of gallstones.

I would like to go on record as being one of the men who do not see intestinal colic as I did formerly. I know what it is to eat too much, and I have seen people eat too much and have gastric distress and vomit, but I do not see colic like I used to. When we learn of gallstone colic and of various conditions based on something we can say is definite, we do not find colic so common. There is an explanation, in my opinion, for all pains about the stomach that persist. I think the men who are doing this kind of surgery now are doing good for their country, to their profession, and to the practice of medicine and surgery. It seems to me we have learned more in the last two or three years from the efforts of those men who have been working in the upper abdomen, about the liver, the stomach, and pancreas, and especially the subject now under discussion than for years previously.

With reference to jaundice, I think the symptoms narrated by Dr. Rogers are typical of all cases of biliary obstruction and for everything in that locality; but I will say, for Dr. Rogers' benefit, we do not get those beautiful symptoms in every case. Any one or two of the symptoms may be quite sufficient if they persist to necessitate operation. In any case where we have a great deal of pain we may have jaundice or may not have it. Very often I find the greatest relief is afforded patients and in those cases where jaundice is not present, and in some of them there is the greatest necessity for operation. Those are the cases that are treated indefinitely by physicians before they are relieved by surgery.

A word or two with reference to the treatment. I know, Mr. President, that the old operation of suspension of the gall-bladder is rarely performed now. After having had quite a number of cases in which this operation was done without mortality, I think the average surgeon, such as myself, had better hold on to an

operation which is so superior, so excellent in its results, and which can be so satisfactorily done by almost any surgeon. There is, nevertheless, this to be considered on the other hand: we remove the appendix because it is adherent, and is a source of danger. For the same reason we ought to remove the gall-bladder. There is no reason, if we go in and find there is a cholangitis and infection showing that there are adhesions around the organ, why we should merely separate the adhesions and leave the thickened gall-bladder, when we can so easily take it out. It can be removed easily. There is very little additional danger. There is, of course, some danger of hemorrhage from the liver, but after one has done the operation two or three times he will not fear that.

Dr. C. N. Chavigny, of New Orleans.—I was called to see a man, a native of Chicago, who was suffering from severe biliary colic. I first saw him during the night, and pain was so intense that morphine was given to relieve it. A thorough examination was made the following morning; all the symptoms of gallstones were found, and operation was suggested, to which he strenuously objected; so I decided to do the best I could under the circumstances, and used the usual medicinal remedies, under which treatment he got along fairly well, and soon was free from all pain. His temperature during this period always remained around 100°. At the end of ten days he was able to sit up, and he told me that it was not necessary for me to see him any more, as he thought he was well enough to get along without a physician. Before leaving I cautioned him in regard to the rise of temperature, and again advised an operation, which he again positively refused.

Two days after discontinuing my visits, I was called for during the night (about twelve o'clock), and found him suffering with a severe colic, more intense than the first, the pain being so intense that I administered one-quarter of a grain of morphine hypodermically. The following morning, at nine o'clock, when I called I found him in a very much shocked condition. Upon examining his abdomen found it to be greatly distended. I advised his wife of his critical condition, and explained the necessity of doing something for him surgically, to which she now consented. When I returned at eleven o'clock he was vomiting the darkish fluid of peritonitis, and I found him in a state of collapse. He was removed to a sanatorium, with the hope of flushing out the cavity, but died shortly after arriving.

Post-mortem examination showed rupture of infected gall-bladder and general peritonitis. A large number of stones were found in the gall-bladder, also in the peritoneal cavity.

I mention this case in support of early operation in gallstone cases.

Dr. C. H. Mayo, of Rochester, Minn.—This is a most interesting subject to me, and one about which we are always learning something.

The question was brought up as to whether we should operate upon every case of gallstones. I presume 5 or 10 per cent. of adults have gallstones. This is a lower estimate than the autopsy records give us, but if we consider the records of post-mortem examinations we will note that the greatest number of cases occur in people who have seen the hardest side of life, and it is such statistics we are continually quoting. They do not apply to people in the ordinary walks of life, but the poor people, who have seen great hardships, and if we go to charity institutions and take their statistics of diseases and try to apply them to mankind in general, we make a mistake.

The essayist has brought up the question of diagnosis. I think if we follow very closely the symptoms, as he described them, we will not do very many gallstone operations. In the last two years I presume one-half of our gallstone cases have been picked from the so-called stomach or indigestion cases. The trouble is that in the surgery of the upper abdomen we have been waiting for these gallstones to knock at the door and demand to be let out; yet in the lower half of the abdomen, if patients complained of one-quarter of the symptoms they have in the upper half, they would be operated on immediately. Appendicitis, tubal troubles, retroversion of the uterus, all forms of disease in the lower half of the abdomen, in fact, operations are demanded, whereas in lesions of the upper half of the abdomen operative interference is delayed.

Speaking of the differential diagnosis, there is a large class of cases in which it is very difficult if not impossible to distinguish between the symptoms of gallstones and those of ulcer of the duodenum. There are a few cases in which it is difficult to separate the symptoms from an appendix that is turned backward adherent up in the region of the gall-bladder or to the stomach, producing traction, or an adherent firm band of omentum dragging the pylorus down. We must not delay operations until we can be absolutely sure of the condition. The whole question is whether it is a surgical condition or not. We operate for the removal of obstruction of the bowels without waiting to tell the patient beforehand what we are going to do. In these cases an exploration can be readily made. It is safe, and if it is made upon people who are ordinarily treated for stomach trouble or dyspepsia, it will be found that most of these people will show some relievable condition that can be remedied by such an operation.

Considering the question of prophylaxis, of primary cancer in 65 per cent. or more (some of the statistics run up into the nineties) of the cases, in dead houses particularly, gallstones from irritation seem to be the principal cause of primary cancer of the liver. Upon examination a white gall-bladder would be indicative of disease, although possibly without stones. If the adhesions are without the gall-bladder, adherent to it all around, but the gall-bladder is blue, look to the duodenum for the cause of the trouble.

Then comes the question of a gallstone impacted in the cystic duct. The gall-bladder may be cystic; it may be full of pus, without causing hardly any elevation of temperature owing to its limited lymphatic supply. So intermittent pain may mean a movable stone in the gall-bladder, the pelvis, the cystic or common duct. A sharp recurrent attack of pain means a movable stone. We look upon every acute case of gallstones as having been infected, the source of infection having often long lain dormant.

In our experience we are operating on more of these stomach cases of the dyspeptic type than formerly, and are frequently finding gallstones.

As to the question of jaundice from obstruction of the common duct, we have had 670 cases, and of this number 11 per cent. were common duct cases. The common duct cases, as reported by foreign observers, ran as high as 20 per cent. We are now doing more and more total cholecystectomies, but always with provision for drainage of the cystic and common ducts, never closing the wounds, but maintaining the freest drainage, because all of these cases that have a free flow of bile for a number of days do the best. We reserve cholecystectomy more for the cystic type of gall-bladder, and it is much easier to remove from the bottom up.

In a case of large, thick gall-bladder we still at times like to excise the mucous membrane, as it serves us a purpose in cholecystectomy. It is done in adherent cases, with thick walls. One prominent surgeon, who has not done the operation, believes it cannot be done, because he says the microscope shows that these walls are agglutinated together. That is true of the fundus, where there is the least circulation and where the inflammatory condition has made a continuous wall of all of the tissues of the gall-bladder. But the fundus is not wanted anyway. If the gall-bladder is opened and split from top to bottom, you can shell out the whole mucous membrane; it leaves the fibrous coat; you can bring the two layers together, and it makes a little protection for drainage. The main thing is to prevent the stomach from becoming adherent.

We look upon every gall-bladder case, with stones, as having been infected originally, the infection having remained perhaps in a dormant or latent condition. If we should irrigate, we might force unknown infection back into the liver-ducts and common duct. I believe what we want is an outward flow of bile, washing out all infection, and if we take a syringe, fasten it tightly to the gall-bladder, and make injections with it as was suggested, if there is infection there will be a possibility of immediate trouble.

Dr. Rogers (closing).—Dr. Richardson has had some cases under observation such as most of us constantly have, and while we are sure they have gallstones, yet the symptoms are not severe enough to cause them to submit to an operation. Hence I insist in my paper that these cases should be kept under observation to

determine just when the crisis comes. Indeed, it would be very much better if they would be operated on before this crisis. However, I do not think of an acute attack of gallstone colic as, say, one of fulminating appendicitis, for in most of these cases there is very little danger in operating during an acute attack. I wish especially to call attention to the frequency of latent cases which have been brought out in the discussion—cases where there are no definite pronounced signs or symptoms, pointing to the existence of gallstones in the gall-bladder, until finally some other malady leads the alert practitioner to suspect gallstones. In fact, many of the obscure symptoms we cannot acount for are due to latent gallstones.

The remarks of Dr. Mayo are eminently apropos, as are those of Dr. Stone and others.

I wish to thank the members for the liberal discussion, and as it is so late, I will close.

THE DIAGNOSIS AND TREATMENT OF CONGENITAL MISPLACEMENT OF THE HIP IN INFANCY.

By Albert H. Freiberg, M.D.,
Cincinnati, Ohio.

Congenital dislocation of the hip has been made the subject of popular and professional discussion to such an extent within the past two years that its recognition in typical cases and after the development of the limp is almost certain to occur. The general practitioner has, indeed, become so eager for the prompt treatment of these cases that in some instances his error has been made on the other side. The limp or waddle, so characteristic of typical and well-developed cases, has been made the principal or even the only diagnostic sign in the minds of many, so that in young children, at least, rachitic bends of the femoral neck or even rachitic lordosis have been falsely looked upon as luxations. That these conditions frequently produce a limp very similar to that of luxation needs only to be known; their recognition then follows easily by considering the constitutional and local conditions.

A fact which is not so widely known as it should be, however, is that congenital luxation need not be accompanied by any but the slightest limp within the first two and one-half years of life; that the shortening and ascent of the trochanter above Nélaton's line may at this time be so slight that in fat babies, particularly, they may be impossible of recognition by the ordinary clinical methods. General acquaintance with these facts has been prevented by two things. The

notion that the luxation was primarily upward and backward, as in the common traumatic form, was the first of these. This has been disproved by Kölliker, Hoffa, Schede, and others, who have shown that as a rule the primary movement of the femoral head is upward and outward—a direction more compatible with the indefinite physical signs above referred to. It was furthermore held by many, and for quite a time, that the replacement of these hips was not practicable before the children had acquired cleanly habits of person. This made it appear less necessary to recognize the existence of the abnormity before the end of the second year of life.

That with the advance of age and the exercise of the weight-bearing function of the limb the difficulty of replacement increases greatly is acknowledged by all. The results reported by those most experienced, Lorenz, Schede, Mikulicz, and Wolff, show, moreover, that the proportion of anatomical cures after bloodless replacement is below 50 per cent. This refers to such cases only in which a true replacement was supposed to have occurred. In a large part of those not anatomically cured great abnormity of head or acetabulum must explain the failure. It is doubted by no one that the abnormity in the shape and size of the head and acetabulum increases steadily during the period elapsing before reposition is accomplished. For these reasons the earliest possible replacement must be considered an important desideratum. Within the past three years it has also been shown clinically that in not a few cases children are born not with luxation of the hip, but only with the predisposition to it, consisting of disparity between the size and shape of femoral head and acetabulum respectively, or the abnormal development of either of these alone.

The examination of 150 radiograms, in Hoffa's clinic, of luxation cases, showed that in 25 per cent. of undoubted unilateral luxations abnormities were present in the supposedly normal hip; usually in the form of a too oblique acetabular roof or a socket which was too wide for the head.

The importance of this observation is emphasized by the paper of Walter.[1] Of especial interest is the case of his own child. On account of a limp a radiogram was made at the age of two and one-fourth years; this was believed to indicate rachitic coxa vara. Treatment by massage was followed by improvement. This was afterward lost, and a shortening of 1.5 cm. appeared. A radiogram taken at the age of four and one-half years now showed distinctly beginning luxation. Two additional cases of similar character are reported by him in children of two and three years. A number of similar cases have been reported by Schede,[2] Heusner,[3] and others. From these cases it would appear that in some instances, at least, the head may remain in contact with the socket for a variable length of time, even in the case of imperfectly developed joints. The greatest factor in breaking this contact must be the act of walking. It remains for us to determine in what manner and to what extent the existence of such conditions can be established, and, having done this, to ascertain the practical value of such diagnosis.

In consideration of the fact that shortening of appreciable extent appears with the development of the weight-bearing function only, and that in a considerable proportion of cases head and acetabulum are in imperfect contact up to this time, it is unlikely that recognition of the deformity will be possible during the first year of life. The length of the limbs is practically equal under these circumstances. Vertical mobility of the femoral head of slight degree is frequently present in infancy for no better reason than laxity of capsule and amplitude of acetabulum. Measurements of children at this age are difficult, particularly as concerns the position of the trochanters. Bade[4] has reported a case in which attention was attracted by the transverse creases in the skin on the mesial aspect of the thigh. Normally, these are two in number: one above, near the abductor fold, and one lower down, near the knee. When the child is placed supine, with pelvis level and both knees firmly held in the

same plane, these creases should be symmetrical. In Bade's case and in the one presently to be reported the crease was higher than on the normal side. I recently examined a child, aged thirteen years, with unilateral luxation, whose mother declared, without suggestion from me, that she had observed this in her child during its infancy, and had even requested the physician to determine its cause. Naturally, twelve years ago such a request was not seriously entertained. The value of this sign has not yet been definitely established, and in bilateral cases would, of course, not avail ; nevertheless, it should receive attention, and should indicate further investigation.

Although the number of histories at my disposal is limited, I have been able to ascertain that in several cases children with congenital misplacement of the hip have been late in walking. It is a common experience in mild grades of rachitis that children are late in walking. The usual age of sixteen months is passed by, and the rachitic child not only fails to walk, but is usually also unwilling to stand. I have been able to ascertain in several cases and to observe in one that children with congenital luxation stand readily at the usual age for walking, and especially if allowed to support themselves by holding on to some object. It is only when independent effort at ambulation is urged that the child shows its timidity and refuses to make the attempt as a normal child will. This period is, of course, gone through by every normal child, but in some cases its long continuance may be attributed to congenital luxation. The length of this period in luxation cases, too, varies greatly, but in every case is finally determined by the child's learning to walk with more or less limping, at which time the diagnosis is usually made, and is of no further interest in this connection. In some few instances mothers observe these things, and possibly, also, that the apparent breadth of pelvis and perineum is unusually great.

It is, therefore, urged that in the presence of any of these signs which have been referred to attention be paid to the

possibility of congenital luxation, and that in the event of any doubt the *x*-ray be resorted to as a final means of precision.

The question of the value of radiography in determining the condition of the hip-joints at this early age possesses considerable interest. In view of the fact that both femur and acetabulum are at this time largely made up of cartilage, a material casting but little shadow under the *x*-ray, it is not to be expected that an exact idea of the condition of the joint is given by radiography. Indeed, it is possible that in some instances our conclusions drawn from radiography alone would be entirely erroneous. This is shown by a case reported by Gourdon,[5] in which the skiagram appeared to indicate the absence of any articular connection between femur and pelvis, but in which by other means a normal joint was proved to exist. There is no doubt, however, that a satisfactory radiogram is the most certain means of recognizing congenital luxation in infancy; and if for any reason its existence is suspected, resort should be had to it. Radiography is naturally somewhat difficult at this age, as the co-operation of the child must be dispensed with. I have found this difficulty to be easily surmounted, however. Having arranged all details regarding the position of tube and plate and the working of the apparatus, a few whiffs of ethyl chloride or even chloroform will suffice to hold the little patient still. It is best to make two exposures to avoid the possible necessity of repeating this slightly disagreeable procedure.

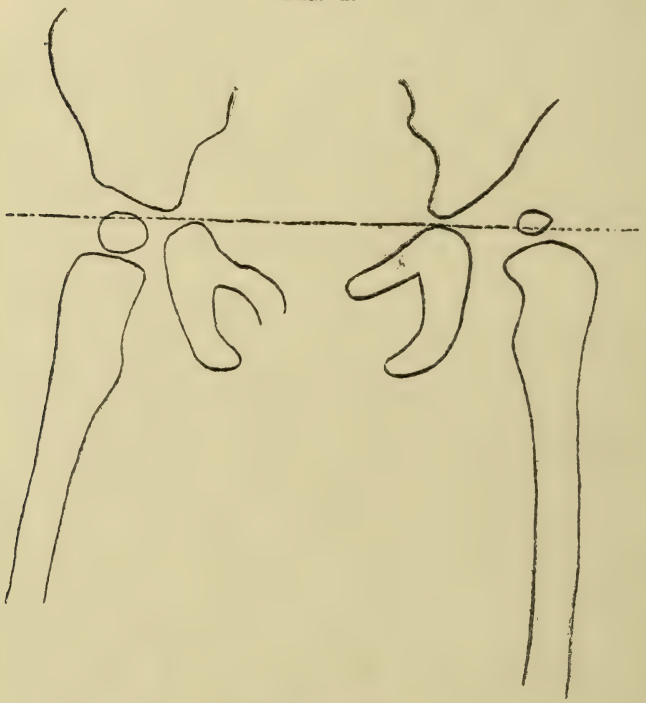
In studying the radiograms of the hips of infants under two years of age, it must be remembered that the bony centre of the femoral head is small in comparison with its cartilaginous covering. On this account, and also because of the large amount of cartilage composing the acetabular part of the joint, the shadow of the head appears normally separated from that of the socket about three-sixteenths of an inch. Under normal circumstances a line drawn through the epiphyseal hiatus of the acetabulum in the radiogram

will be tangent to the upper margin of the shadow of the femoral head. To determine definitely the relation of the head to the acetabulum it is necessary to photograph the joint, both in internal and external rotation. The appearance of the iliac portion of the acetabulum is most important. Normally, this " roof " of the joint should be almost horizontal. In luxation cases it is invariably quite oblique. A slant of 45 degrees is quite common, and it may be so oblique as to convey the impression that, in the event of reduction, the femur would find no purchase at all. This impression is, however, apt to be erroneous, since it ignores the existence of cartilaginous material sufficient to hold the femur in place, reduction having been accomplished. The value of the obliquity of the acetabular roof lies in its drawing attention to the malformation of the joint, valuable confirmatory evidence, especially at this age and in the case of incomplete luxation. In view of the above considerations it will be seen that, valuable as is the radiogram in the diagnosis of luxation and subluxation, the appearances there found cannot be used with accuracy in determining the prognosis after reduction. This is to be drawn from the behavior of the joint under manipulation upon the operating table; stability of reduction here argues for the success of the operation, and *vice versa*.

In discussing the treatment of malpositions of the hip in infants under two years of age, it is not proposed to consider the technique of the operation or the subsequent plaster dressing. The proposition is simply advanced that experience has abundantly shown the feasibility of the procedure after the age of one year, and that the results amply justify the great additional care which is necessary to prevent the dressings from becoming soiled in patients so young. Differing in no essential detail from the operation upon children a year older, the manœuvre is likely to astonish one by the ease with which reduction is accompanied, and by the stability of the femur in its new position, even when the limb is adducted. Tracings from radiograms of a case before and after reduc-

tion are offered in evidence of the statements just made. The child, a girl, was brought for examination at the age of seventeen months because it would make no attempt to walk. The child was unusually heavy, but from its birth perfectly healthy. It was born after a perfectly normal pregnancy and labor, the latter requiring no assistive manipulation

Fig. 1.



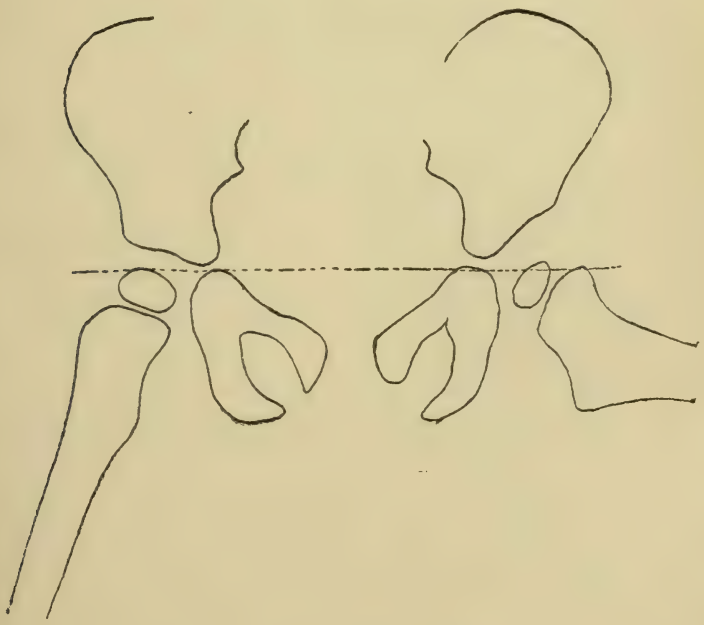
Before reposition.

whatever. At the end of the first year the child began to stand with support, but could not be made to attempt walking up to the time I was consulted. At this time the child's physical condition seemed perfect with the exception of the left lower extremity, which appeared something less than one-quarter of an inch shorter than the right. There seemed to be slight vertical motion in the left hip, but not in the right. The position of the trochanter and the relation of the femoral head to the femoral artery could not be made

out on account of the great amount of fat. The radiogram (Fig. 1) showed defective formation of the acetabulum, a capital epiphysis smaller than on the right side, and situated upward and outward from the normal position.

The reposition was exceedingly easy, and occurred with a snap so violent that the onlookers thought the femur

FIG. 2.



After removal of first dressing.

must have been broken. In the ease and stability of reposition it was like a traumatic luxation. The plaster dressing was applied in the usual manner, especial care being taken to protect the plaster by draw-towels and rubber protective. The recovery was uneventful, and the child made its first attempt at walking three weeks after operation. Ten weeks after this the child was chloroformed after removal of the plaster, and a radiogram made without disturbing the position of the limb. Fig. 2 is a tracing made from this, and

shows, I believe, a perfectly satisfactory position. The second plaster dressing was applied after reducing the abduction more than half. It is as yet too early to speak of the ultimate result of this case, and it is offered only as evidence of the ease and stability of reduction when done early, and the feasibility of maintaining it in very young children. It seems, moreover, fair to presume that if in this case another year had been allowed to elapse without reposition the difficulty of accomplishing it would have been greatly increased. It is more than possible that in this time, also, alterations in both hard and soft parts would have occurred sufficient to render an anatomical cure impossible.

Having discovered that imperfect formation of the hip-joint exists before the contact of femur and acetabulum has been markedly disturbed, it should be possible to prevent the further progress of luxation and to favor the development of a secure joint. This would be accomplished by maintaining the limb in decided abduction, say of 25 degrees, during the act of walking. The plaster spica worn for a period of about six months in this position should rightfully be considered the best means of attaining this end. A brace might doubtless be made to act similarly, though with less certainty and constancy.

[NOTE.—Since the foregoing was written the last plaster dressing has been removed from this patient. The radiogram shows a perfectly satisfactory position of the femur. The acetabulum has developed considerably, so that the difference in slant of the joint roof of the two sides is now only ten degrees. The limbs are now of equal length and the child walks without the slightest limp.]

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5. Gourdon. Abstr. Zeit. f. orthop. Chir., Bd. xi. p. 681.

DISCUSSION.

Dr. A. R. Shands, of Washington, D. C.—I regret very much that I cannot discuss this paper intelligently, as I did not hear all of it. However, the essayist raised an important question in connection with this malady, namely, the early recognition and treatment of this trouble in infants. It reminds me very much of what the gynecologists have been saying during this meeting with reference to the early recognition of cancer of the uterus, and if such cases were recognized at once and operated upon, a great many more lives would be saved. I have no doubt that if these congenital misplacements of the hips were recognized early in infancy, the necessity for the heroic operations that are done later would be obviated. My experience has been limited to older children, and I believe Lorenz himself, so far as I know, does not recommend any operative procedure under three years of age. I do not know why. It seems perfectly feasible that if these cases were recognized sooner, greater good could be done. But I have had no experience along the lines mentioned in the paper. I wish to congratulate the essayist in bringing this subject forward, and to thank him for setting me to thinking on the subject.

Dr. Freiberg (closing).—My paper was simply a plea to those men who see these infants before the orthopedic surgeon gets a chance to see them. If these conditions are not suspected by the general practitioner, the orthopedic surgeon will rarely get an opportunity of seeing them at an early stage, and I believe it is going to be just as much the business of the family practitioner to recognize cases like this at an early stage as it is his business to recognize any other malformation without having his attention specially directed to it. As it is now considered the business of the family practitioner to see, when a child comes into the world, whether or not there is any atresia of the anus or of the urethra, so I think the time has come when the general practitioner should recognize the existence of congenital luxation or of a malformed joint before the period of walking has arrived, before the limp makes it easy to recognize that some decided abnormality is present in the child.

SPURIOUS DYSMENORRHŒA.

A Plea for a More Rational Treatment.

By Henry T. Byford, M.D.,
Chicago, Ill.

There has been but little improvement in the pathology of dysmenorrhœa since the birth of Christ.

Until recently the profession was affected with at least four different varieties of the disorder, the nervous, the mechanical, the inflammatory, and the ovarian, to say nothing of the membranous, the obstructive, the tubal, the uterine, neuralgic, plethoric, vascular, vaginal, spasmodic, stenotic, neurotic, dermatic, rheumatic, pneumatic, strumatic, ecstatic, bimensual, sympathetic, apoplectic, cataleptic subvarieties that are propagated in medical literature.

Dr. Pryor has cured us of the nervous variety. And I wish there were a thousand Pryors to cure us of the other varieties, which are giving, however, less and less trouble as the centuries slip by.

Yet, in one sense, there *is* a nervous dysmenorrhœa; only it is *not* a nervous dysmenorrhœa. I mean by this that nervous dysmenorrhœa is not gone; only that it never existed. Our patients never had it, but the profession has made them believe they had it.

I have frequently questioned my patients, particularly those who complained of terrible and awful pains at the menstrual periods, as well as at all other periods or places that might be suggested to them. I have cross-questioned them in detail about the exact place and character of the

suffering, and, after sifting the answers, have found the complaint to consist of an awful discomfort, a great distress, an extreme heaviness, an indescribable sensation, not exactly a physical pain, but something that could not be explained, etc. They could not locate anything tangible, but they felt worse during menstruation, or thought they did.

There is a class of patients that have watched and speculated upon their sensations until they can feel the uterus moving about beneath the umbilicus, or falling all over the pelvic floor, or taking a peep into the world, or the ovary pressing against the abdominal wall near the anterior superior spinous process of the ilium. One of them told me that she could tell by her feelings when the valve of the heart opened and let the menstrual blood escape into the uterus. And such a patient convinces her "good and faithful" husband of the accuracy of her autodiagnosis, which he defends against all comers. And she teaches her young and progressive medical attendant things that he never dreamed of on the seats of the college amphitheatre. And her case is usually the most wonderful on record, because no doctor can cure her of what she complains of. She is as full of new and unheard-of symptoms as we are of new and untried remedies, and is as willing to take them as we are anxious to try them.

Hysterical and neurasthenic patients often think that they have dysmenorrhœa, just as they think they have almost everything else, but after they take the rest cure and subsequent physical training they forget about their pains, or can be made to forget them by tactful and persistent suggestion. Or if *we* cannot persuade them to get well, a Mrs. Eddy or a Mr. Dowie often can. We cure them and the Eddy or Dowie pronounces them cured, and thus performs the miracle. The devil is cast out of the patient, and is usually bestowed upon the medical attendant.

In all such cases there is undoubtedly enough local trouble to attract the vigilant patient's attention, or there may have been formerly or at particular times in her life actual pelvic pain or a stomach ache. But the real condition is not the

pain but the mental attitude, the habit of worrying over and complaining of all of her sensations, and the fear that every discomfort indicates something harmful. And often there is a feeling of desperation because she keeps on having sensations in the pelvis and elsewhere. If she feels nervous, she blames the pelvis. The sudden sight of a mouse will bring on an attack if she have it not, or may cause her to forget it if she have it already.

One physician braces up his patient with tonics until she feels strong and ambitious and forgets her *je ne sais quoi* kind of suffering, and then declares and believes that metritis and oöphoritis are constitutional affections, and that local treatment is medicine given at the wrong end of the body. He gives her iron and phosphorus and cheats pathology of its diagnosis and the profession of its operation.

Then comes along the rhinologist, who makes her head light with applications of cocaine to the nasal tubercle, so that she does not feel the heaviness below. He converts the dysmenorrhœa into a dizzymenorrhœa, and thus diverts her attention. He knows that the uterine and ovarian nerves terminate or arise in the nose, or have Marconi-like terminal facilities, no matter which, no matter what, no matter how, and that is all he knows about it. He has nosed out the enigma with rhinoceros-like directness and fearlessness, and thus given the nose a new function. He goes the mouse one better.

There are gynecologists and rhinologists who maintain that a woman can menstruate through her nose if she takes a cold or something else that interferes with the normal flow, just as a man can talk through his nose if he takes a cold that interferes with normal vocalization. Now, such gynecologists and rhinoceroses are not color-blind, for they can distinguish a red discharge from a white one, and probably a red nose from a white one, but they lack the sense of perspective; they cannot locate. They cannot differentiate nasal leucorrhœa from a cold in the head. They know that blood is thicker than water, and regard blood from the uterus and blood from the

nose as related phenomena. This family relationship is proved by the fact that a tubercle is not only found in the nose, but that tubercles are occasionally found in the uterus. The fact that the effect of cocaine on the nose wears off quickly, but that it persists in holding in check the menstrual pain, either unilaterally or bilaterally, as the nose may nominate, proves to them that the nose is the parent or arbiter of uterine function, and that the offspring is obedient and well trained. A hint to a child is sufficient in a well-regulated family, and the forbidden pain dare not return. The nasal treatment is a blessing to modest old maids who have no family. They take to it kindly and blindly.

In the light of all this, the nose may be said to have three functions, that of smelling, that of blowing, and that of menstruating, requiring an odor for the first, a handkerchief for the second, and a defaulting uterus for the third. It constitutes a marvellous trinity, a proof of the resourceful energy displayed by the Creator when he had to make both ends meet.

What wonder then if the nose, that most tangible and abused of all intelligent organs, that tunnelled delight of germs and disease, that turbinated vault where odors are caught and classified and blown out in blasts, should be seized upon by the blasé and worked-out gynecologist? How long will it be before hysterectomy will be recommended for nasal polypi, ovaries be removed for ozæna, and the uterus curetted for sneezing? To the credulous, all things are credible.

We have incidentally discovered in the nose a new avenue for the conduction of maternal impressions, and one which also renders paternal impressions possible and most natural occurrences. I would suggest nasal application of cocaine at the beginning of pregnancy to prevent maternal impressions, and again at the end of pregnancy to cure those already produced. The father's nose should be cocainized before conception takes place. The nose is our latest find. Let it have its day for the benefit of history and hysteria, of mouchoirs and menstruation.

I often think that many women have dysmenorrhœa because they have learned that they have organs to provide it, just as savages and animals do not often have it because they do not know that they have organs adapted to its production.

But this cannot always have been thus, because many cases of menstruation from the male urethra are on record. Mehliss says that in ancient days menstruation was often inflicted upon the Jewish men as a divine punishment. Bartholinus, Zacutus Lusitanus, Salmath, Hagedorn, Fabricius, Hildanus, Vesalius, Mead, and Acta Eruditorium, all mention instances in the male, with lunar manifestations. The moon, and not the ovaries, determines the cycles of recurrence in these cases. And in men, as in women, menstruation may be abnormal and vicarious. Moses mentions two cases of menstruating ulcers of the head.[1] Menstruation on the brain is another anomaly that has afflicted members of the male sex.

I often think that this learned discussion of symptoms and pathology is due to German inoculation of our meandering medical youth. Formerly we did not have any learned discussions in this country. We were original and intelligible, and paid no attention to German methods. The Germans are so conscientious and painstaking in their investigations, and probe every new idea to the bottom so faithfully that their very probity misleads them, especially if the idea be in the bottom of the pelvis, and the pelvis be feminine and fickle.

No, my friends, the profession has been coquetting with dysmenorrhœa too long. We should remember that we have been dealing with the opposite sex, which no man can understand. This is why so many cases of dysmenorrhœa cannot be cured by our art. We are, in fact, giving it up, and its discussion is disappearing from our text-books. In an article published in November, 1903, an eminent authority says: "The cases of dysmenorrhœa that are amenable to successful treatment are comparatively few."[2] He undoubtedly refers to this spurious class of cases, or possibly he does

[1] Gould and Pyle, Anomalies and Curiosities of Medicine, 1897.
[2] American Gynecology, No. 4, vol. iii. p. 375.

not understand woman and her ways. He may not understand that it is only by persistence in the face of apparent difficulty and opposition that woman can be conquered or cured.

But there is another way of looking at the question, viz., the worldly or business side. When we lose a patient by death we are rewarded, and two or more patients arise to take her place and her chances, but when we make way with a disease we lose both capital and wages. We are the only set of men who have no business principles. We do not make everything and everybody pay. We conscientiously pay our own debts and leave it to our patients' conscience to pay theirs, forgetting that they have no conscience. I would not like to treat nervous dysmenorrhœa in women on strictly business principles, because I am too chivalrous; but if I could give the ailment to some of the business men that have doctored me, I would feel justified in using business principles. I would vote to combine, to unionize, to strike, to coerce, and to collect. Whatever might happen to the patient, I would keep the disease alive. This is business principle.

But menstruation itself, apart from the nerves and the nose, is a reality, and should not be spoken of lightly. It is God's peculiar gift to women, who are angels on earth. What would woman be to a man without it? A barren waste of meaningless millinery, a solitary eye-wiper and nose-blower, less than half a being, a hopeless old maid. The devil wouldn't want her.

But she was destined to a different fate. She was made to menstruate and endure the ministrations of the gynecologist and rhinologist. As a compensation, however, she was made a little lower than the angels. Just low enough for us to worship her. Let us, therefore, worship her, and operate upon her, and afterward try to cure her.

> O woman! in our hours of ease,
> Hysteric, sick, and hard to please;
> Irregular as is the shade
> By the sad quivering aspen made;
> When monthly anguish wrings thy brow
> A menstruating angel, thou.

But seriously, in conclusion, with regard to this will-o'-the-wisp, dysmenorrhœa, this primitive protegé of medical literature, this many-headed hydra of the text-books, this target of shotgun therapeusis, whether we consider it under the control of nose-spots or sun-spots, of ovarian or lunar changes, whether it requires to be treated with cocaine or cautery, medicine or moonshine, we must remember to practice our art as well as our science. We must study perspective and learn how to locate the right place in the right end. We must also study the relationship between the true, the spurious, and the good dysmenorrhœa, so that when we come to philosophize and pathologize about it we will be better, or at least appear better, for having taught and talked.

I formerly thought it profitable for the medical student to study the symptom dysmenorrhœa in detail, or, in fact, any other important symptom in detail, but I am now converted to the belief that if this symptom were mentioned only in its proper place or places, as other symptoms are, and not brought into the foreground when it belongs in the background, there would be considerably less waste of ink and intellect over remote reflexes, pain projections, inner connections, sense radiations and nonsense diffusions, and less of a tendency to treat the symptom to the neglect of the disease.

Let homœopaths treat symptoms, let fakirs hypnotize, let Dowieites perform miracles, let osteopaths rub it into patients, it is for us to treat disease.

DISCUSSION.

Dr. O. L. Shivers, of Marion, Alabama.—I have been very much interested in the paper of Dr. Byford with reference to spurious dysmenorrhœa. I believe many of these women need dilatation of the cervix so as to afford a free exit for the secretions. In some cases there may be flexion or retroversion, which ought to be corrected. Speaking of the nervous part of dysmenorrhœa, I do not believe medicine or anything else will afford relief.

Dr. Charles M. Rosser, of Dallas, Texas.—The essayist brought out very clearly this eternal matter of self-examination which physicians impress upon patients by suggestion. They do

not suggest the brighter and better side of life, but suggest things which may make women feel they have every supposed ailment. The author referred to an important point when he told us that it was just as necessary for us to cure people of the things which they thought they had as to cure them of the things which pathologically distressed them. If women would learn some of the things they ought to know about themselves and their habits, and concentrate their thoughts upon these rather than upon their misfortunes and miseries, we would have a much happier race and a little less to do.

Dr. H. A. Royster, of Raleigh, N. C.—The surest way to stamp out an error is to launch on it ridicule. I have read the paper of Dr. Emil Ries, who proposed the treatment of dysmenorrhœa by applications of cocaine to the nasal tubercle. Dr. Byford's paper is a thorough answer to the plea made by Dr. Ries.

I agree with Dr. Byford in saying that the consideration of dysmenorrhœa as a separate entity should never be undertaken before medical students, and it should be clearly pointed out that dysmenorrhœa is a symptom alone.

The question of spurious dysmenorrhœa reminds me of the country physician who said there were only two classes of skin diseases, one of which zinc ointment would cure and the other which it would not cure, and somebody added a third class—one that the devil himself cannot cure.

Dr. M. C. McGannon, of Nashville.—Dysmenorrhœa is a symptom, and it should be taught as such, since that is unquestionably true. If dysmenorrhœa is a symptom, then there is no place for the term, since there is no such thing as spurious dysmenorrhœa. Dysmenorrhœa being a symptom, we should consider it wholly as such, and try to ascertain the disease or diseases of which it is a symptom.

At the present time we look upon a good many symptoms as being neuroses without pathological basis. But the more we study the subject the more we become convinced that there is a pathological side causing nearly all of these symptoms. I believe there is a pathological side to all cases of dysmenorrhœa, and if we study them sufficiently we will find there is some pathological condition, if not in the pelvis, elsewhere, to which the symptoms of distress and pain referred to the pelvis may be attributed. I do not believe that there are any cases of actual pain referred to the pelvis coming on at the menstrual epoch in which the application of cocaine to the nose, or the suggestion of a Dowieite, will dissipate or relieve the pain. I have tried suggestion and many other things in these cases in which I was unable to find a definite pathological entity for the production of the symptoms or symptom, and I have not been able to cure them by such means. In many cases, on the other hand, after persistent efforts for more than a year along the line of suggestion, I have removed pathologi-

cal conditions and by this means dissipated the symptoms. Personally, I do not believe there is any such thing as spurious dysmenorrhœa, if the term is meant to express painful menstruation due to faults of the imagination.

Dr. W. L. Robinson, of Danville, Va.—I am fully in accord with what the essayist has said in regard to spurious dysmenorrhœa. When a man who has been in practice for years sees these neurotic cases disappear with non-attention to their complaints or whims, but who have simply taken outdoor exercise and fresh air, with complete restoration, he can only be convinced that there is no mechanical condition existing in these cases, and that they are entirely spurious. The restoration to health of these patients is a disabusement of the mind of the real existence of such a thing.

Dr. Byford (closing).—I wish to thank the gentlemen for discussing my paper. It received more discussion than I had expected or desired.

I am afraid the gentlemen thought I was trying to make a burlesque of the subject, but I assure you the paper was written with serious intent, and I would not run the risk of making a fool of myself over a subject unless I thought it worth something. It is a serious matter for one to get up and make a fool of himself, as most of you know by personal experience. (Laughter.) There are no people who appreciate the sense of humor as much as the Southern people, and I felt I could risk what I had to say in trying to make the subject ridiculous. There was really no other way of treating it. If the subject of treating the nose for dysmenorrhœa were considered seriously, practitioners would go on spending their time treating these cases, and the profession generally would spend valuable time in investigating the nose as a sexual organ, and innumerable papers would have to be written and read, and we would have to establish more medical journals to publish them.

SURGERY OF URINARY TUBERCULOSIS IN WOMEN.

By Guy L. Hunner, M.D.,
Baltimore, Md.

In a recent paper on "Tuberculosis of the Urinary System in Women"[1] I reported 35 cases which have occurred in the service of Dr. Howard A. Kelly and his associates in Baltimore.

That paper was devoted chiefly to the questions of diagnosis. These must likewise be emphasized in this paper, for there can be no true surgery of the urinary tract without painstaking and in the majority of cases accurate diagnosis.

In addition I wish to give you some idea of the present status of the surgical technique as evolved in the work on these 35 cases. And finally a review will be given of the results of this surgery, with reference to wound healing, cure of the local disease, and effect on the general health of the patient.

Etiology and Pathology. All of our cases were in women, and their average age at the time of treatment was thirty-two and one-half years, the average duration of symptoms having been four and one-half years.

[1] This paper was published in the January, 1903, number of the *Johns Hopkins Hospital Bulletin.* The reader is referred to this journal for a brief summary of the history of each of these cases. The designation by case number in this present paper refers in each instance to the cases as cited in the former paper.

Expressed in decades the classification of ages at the time of treatment is as follows :

Ages.	No. of cases.
10 to 19 years	1
20 " 29 "	14
30 " 39 "	12
40 " 49 "	6
50 " 59 "	2

Considered from the age of onset the majority of patients were under thirty years of age; 22 of these were at the Johns Hopkins Hospital, and it is interesting to note that while one-fifth of the gynecological patients at that institution are colored women, and while the colored race is peculiarly susceptible to tuberculosis in all its forms, medical and surgical, all of these patients were white women.

The family history was recorded in 28 cases, and in 13 of these there was noted tuberculosis in some member of the family.

Several patients had foci of disease elsewhere; 1 patient had suffered from a knee-joint inflammation, probably tuberculous in nature, after her urinary symptoms were established; 1 patient had had tuberculous right submaxillary glands removed two years before her bladder symptoms began; 1 was operated on for suppurating axillary glands two months after her kidney operation; 1 case had been operated on for pelvic inflammatory disease, probably of a tuberculous character, three years before her symptoms began in the kidney; 1 patient has had her pelvic organs removed for tuberculosis since her nephrectomy; 5 patients, not of the above number, had evidence of former or active lung involvement.

The operation was on the right side in 17 cases and on the left in 18 cases.

All of the cases showed the chronic caseous form of nephritis in contradistinction to the acute diffuse miliary type. All grades of nephritis were seen, varying from the kidney with multiple small nodules or abscesses, with much

of the kidney still functioning, to the cases of pyonephrosis with complete destruction of the secretory substance. Several were smaller than normal and largely occupied by fibrous tissue. One kidney was converted into a multilocular cystic mass.

When kidney and bladder are diseased it is impossible to say in which organ the disease was primary. There was no cystoscopic note in 4 cases. The bladder was normal or showed simple redness and swelling of the ureteral orifice, thus indicating a kidney origin, in 13 cases. The bladder was ulcerated or showed distinct inflammation about the ureteral orifice in 18 cases. Excision of the ulcerated areas in 1 of these cases resulted in cure, and the excised tissue was not tuberculous; 2 cases healed rapidly on ordinary cystitis treatment after excision of the diseased kidney, and 1 case healed spontaneously within six months; 1 case healed before removing the kidney, on having a vesicovaginal fistula made and receiving daily irrigations; 1 patient with slight inflammation about the ureteral orifice has had no treatment and no symptoms since the kidney extirpation. I would class these 6 cases among those whose disease was primary in the kidney; 1 patient died eleven weeks after operation from apparent failure of the other kidney. Her disease may have been primary in the bladder. This leaves 11 patients to be accounted for out of the 18 who were known to have bladder lesions. All of these 11 patients still have some bladder symptoms, and 4 are known to have ulceration of the bladder; 9 of them have had more or less thorough bladder treatment. This persistence of the bladder lesion after removal of the diseased kidney, and in spite of treatment, is good evidence, I think, that these 11 patients have tuberculosis of the bladder.

Was the disease primary in the bladder in these 11 cases? It may seem significant that the symptoms first began in the bladder in 8 of these. But we can no more draw dogmatic conclusions from the history than from the patho-

logical conditions; 3 of the patients with extensive kidney lesions had complained only of bladder symptoms, over periods of thirteen months, three and two-third years, and nine years, respectively. Of the 13 cases which the cystoscope showed to have normal bladders, 10 had suffered with bladder symptoms at some period, and the earliest symptom was in the bladder in 4 cases. In my former paper I stated "while the symptoms first noted were in the bladder in 17 out of 34 of the cases, a close scrutiny of the histories and comparison with the clinical and pathological findings convince me that in by far the great majority of cases, urinary tuberculosis in women originates in the kidney. With the widest margin in favor of primary bladder infection I have classed but 5 of the 35 cases under this heading." On more careful investigation I am still less inclined to consider any of these cases as cystic in origin.

In 30 cases reported by Israel he thinks that 8 may have been of the ascending type, but his cases include both sexes, and we would expect the ascending form more frequently in men. In favor of descending infection is the fact that of the 11 cases of our series showing probable bladder tuberculosis, in 8 the lesion was local and confined to the region of the ureteral orifice on the affected side.

I have seen but 2 cases of urinary system tuberculosis in which the lesion was apparently confined to the bladder, and 1 of these was a case of direct extension of the disease through the bladder wall after operation for pelvic tuberculosis.

Of the 13 cases with normal bladder only 4 had any evidence of tuberculosis outside the kidney and ureter. There is scarcely any doubt that in addition to claiming the kidney as the most frequent primary seat of tuberculosis in the urinary system, we may also say that it is not infrequently the primary seat of tuberculosis in the body as a whole. This is an important conclusion if we are to consider kidney tuberculosis a surgical disease.

Symptoms and Diagnosis. Symptoms may be entirely wanting, the patient complaining only of "blood in the

urine" (Case 13), or of a "thick, ropy urine" (Case 6). From a comparison of clinical histories and pathological findings there can be but little doubt that a characteristic of the disease is its latency, hence the slow onset of symptoms in most cases, as also the sudden onset, like an attack of renal calculus in other cases, where the first symptom is probably caused by the blocking of a thickened ureter with a bit of caseous material or blood clot from the kidney.

Pain. In 17 of the cases the first symptoms were referred to the bladder; 11 of the patients complained first of a discomfort in the back, varying from a slight soreness or fulness, or stiff feeling, to all grades of backache; 5 patients gave a history of acute onset with renal colic, in which the first or early attacks of sudden violent pain were accompanied by nausea, vomiting, chills, and fever. Pain in the course of the ureter is not uncommon.

Bladder Symptoms. These were present at some time in the course of the disease in 31 out of 34 cases in which a history was recorded. In 3 of the cases the entire local symptoms had been confined to the bladder. The symptoms vary from a slight discomfort, with frequency of urination, to the most excruciating pains. The most severe pain may arise during the act of voiding, giving rise to strangury and bleeding. Reflex symptoms from the kidney or ureter are very common, as seen from the fact that 31 out of 34 of these patients had bladder symptoms, while only 18 had bladder lesions. These reflex symptoms usually take the form of a constant desire to urinate. The frequency may occur only during an attack of kidney colic, or during the attack there may be severe spasmodic pain referred to the bladder. Pain referred to the urethra or to its external orifice is not uncommon.

Urine. Polyuria is said to be a not uncommon feature in the early stages. I find that the average patient does not differentiate between the frequency incident to the early irritation and an actual increase in amount of urine. Oli-

guria is common in the later stages of the disease unless the patient is drinking large quantities of fluids.

Hæmaturia. It is probable that blood is present at some stage in every case; 10 patients had noticed blood in the urine, 5 histories state that no blood had been noticed while in 20 cases there is nothing said about this point in the history. In 6 of these 20 cases, however, blood was found microscopically after their admission to the hospital. Blood, unless carefully looked for, may be easily missed in the routine microscopic examination, because of the large number of pus elements. When blood was noticed by the patient it was generally in the early history of her symptoms. Our earliest case was one in which hæmaturia for two months had been the only indication of disease. After the bladder is involved in ulceration blood can always be found microscopically, and I have seen it profuse from this source. Cases of serious hemorrhage from advanced kidney disease are reported in the literature. Of the 10 cases which had noticed blood, 8 cases were examined cystoscopically, and all but 1 of these had ulceration of the bladder. König[1] says that before the foci of disease communicate with the pelvis there may be absolutely no sign of disease in the urine. We would expect, however, in all cases to find some microscopic evidences of disease, such as blood, pus, tubercle bacilli, or casts, before there is actual communication with the pelvis.

Pyuria. Pus was present in every case. With blocking of the diseased ureter the urine may be clear. The amount of albumin seemed to vary largely with the varying quantities of pus and blood. Casts, hyaline or granular, or both varieties, were reported in but 3 cases. I believe careful examination of fresh specimens would reveal casts more frequently.

Urea Tests and Cryoscopy. Urea tests for the two sides were recorded in but few cases. This test always shows a

[1] Deutsche med. Wochenschrift, February 15, 1900.

marked diminution of the urea percentage on the diseased side. Cryoscopy was tried in 2 of these cases and yielded striking results.[1] In Case 24 the urine catheterized from the diseased side showed a freezing point of 0.49° F., while a mixed specimen froze at 1.89° F. In Case 31 the urine from the diseased side congealed at 0.625° F., and that from the good kidney, collected through the bladder, at 1.74° F. The freezing point of the blood in these 2 cases was normal, or 0.56° F. In the average case we can make an accurate diagnosis without cryoscopy, but in case of disease of both kidneys the freezing test for the blood and separate urines will prove of great value in determining whether there is approximate renal sufficiency, and the relative value of the two kidneys; in other words, whether any operative interference is justifiable, and if so, whether one or both kidneys should be operated on, and the nature of the operation.

Reaction. The urine was acid in every case, thus demonstrating that the popular text-book idea of alkaline pyuria differentiating a cystitis from a pyelitis will bear revision.

Bacteriology. Slant agar tests were made in many of these cases, but unfortunately the records are preserved in but 9 of them. Of these, 4 were sterile, 4 contained a colon bacillus growth, and 1 a growth of streptococcus. From my bacteriologic observations I would say that the rule in tuberculous pyuria is to find sterile urine when testing on our ordinary media.

The mixed infection in all our cases but one has been by *bacillus coli.* It is probable that the acid urine present in tuberculous cases limits the varieties of bacteria that can exist in the urine to the acid producers. On the other hand, the presence of colon in most of these mixed infections of our series may be a coincidence, for we know that about half of all cystitis infections are by the colon group.

[1] Tinker, Cryoscopy as an Index of Renal Insufficiency, etc., Johns Hopkins Hospital Bulletin, June, 1903.

Demonstration of the presence of tubercle bacilli is the only manner in which we can make a positive diagnosis. This is done by finding the bacilli in the urine or by causing tuberculosis in the guinea-pig by urine inoculation. Tubercle bacilli should be demonstrated in practically every case. One or two slides made from the centrifugalized urine should be examined daily for at least a week if necessary. In this time there is almost certain to be a breaking down of tuberculous foci and the precipitation of bacilli. This is a far less laborious and more certain method than that of examining a multitude of slides in one day. I allow the catheterized specimen to stand in a conical glass for a few hours and then pipette about 5 to 10 c.cm. from the bottom for centrifugalization.

The differential stain should always be used. We have heretofore considered that drawing a catheterized specimen from the bladder excludes the smegma bacillus. But I have had an experience only the past summer that demonstrates the necessity of a differential stain in all cases. From a bladder showing universal ulceration, apparently secondary to disease of the right kidney and ureter, I obtained by catheterization a specimen of urine on two different days, each specimen showing by the Gabbett method of decolorizing a number of organisms retaining the typical stain, but being somewhat plumper in form than the tubercle bacillus. No evidence of tuberculosis could be found in the excised kidney and ureter, and after a vesico-vaginal fistula and irrigations for six months I was able to close the fistula over a bladder with normal mucous membrane. I do not believe this could have been a tuberculous bladder. One case (No. 15) of our series makes me question whether even the differential stain can be relied upon. Her physician, one of the most scientific in New York City, had repeatedly found organisms corresponding to tubercle bacilli after the differential stain. After the patient's admission to the hospital the ward interne, using the differential stain, found similar organisms in a cathet-

erized specimen from the bladder. These specimens were examined by the Hospital Pathologist, Dr. N. McL. Harris, and considered by him as undoubted tubercle bacilli. But most thorough search of sections taken from every portion of the necrotic and sclerotic kidney failed to show any tissue with evidence of tubercles. This patient's urine is normal at present, showing that the bacilli in question were in all probability not from the remaining kidney. Case 12 had a similar sclerotic kidney, and in this there was but one small caseous focus in which tubercle tissue could be demonstrated. Every other portion of the kidney showed chronic granulation tissue, but no areas typical of tuberculosis. Knowing that we may have complete obliteration of the tissue typical of tuberculosis, I have depended upon the differential stain in Case 15, and upon this evidence only has this case been included in this series. Future work may show that the differential stain cannot always be depended upon.

In 22 cases, on which a note is made as to search for tubercle bacilli, 15 yielded positive results. In 1 other case bacilli were not found, but inoculation of a guinea-pig with urine from the affected side resulted in death of the animal from tuberculosis. Of the 7 cases in which a negative note is recorded there was usually but one effort made to find the bacilli. Of the 15 positive cases, 8 were specimens catheterized from the bladder, and 7 were specimens taken directly from the kidney. In 1 of the latter bacilli were found in specimens catheterized from either kidney. As one would expect, bacilli seem more plentiful in the specimens taken directly from the kidney. If the guinea-pig is used for purposes of diagnosis it is well to inject at least three pigs, one intraperitoneally and two subcutaneously in the flanks. A catheterized specimen should be taken into a sterile receptacle and centrifugalized as soon as possible under approximately aseptic precautions, and the centrifugalized sediment should then be used for inoculation before there is time for development of contaminating

organisms, for the guinea-pig is peculiarly susceptible to infection and is likely to die early if organisms other than the tubercle bacilli are introduced. If a specimen of the diseased bladder tissue can be curetted a portion of this may be introduced into the flank of a guinea-pig, while the remainder is kept for microscopic examination.

Tuberculin Reaction. If tubercle bacilli cannot be found, and one has no time to wait for a guinea-pig test, the tuberculin reaction may be tried. This is uncertain in cases with fever, but for suitable cases we have learned to place considerable confidence in its indications.

Cystoscopy. Examination of the bladder with the cystoscope is of great service in diagnosis. Very often there is no change in the bladder, except a slight redness and puffiness of one ureteral orifice. Again there may be local changes of considerable degree in the bladder mucosa about the orifice corresponding to the side of kidney disease. If the bladder is universally inflamed one may still be positive about the diseased kidney, from the fact that one ureter is thickened and shortened, and its orifice, instead of standing out on a mons ureteris, is located in a saucer-like depression of the bladder wall.

Catheterization of the Kidney. In my former paper I stated my views against the catheterization of a supposedly healthy ureter and kidney in the presence of disease of the other kidney. Much information may be gained regarding the character of the urine and the rate of flow by simply placing the patient in the Sims or the knee-chest posture and watching the ureteral orifices. More can be learned by catching the urine for examination as it leaves the ureters. Dr. Kelly has a speculum with an oblique end which is more easily held to cover the ureteral orifice than is the ordinary circular end speculum. Our usual method of separating the urine is to catheterize the diseased side and have the patient take the dorsal position. The bladder is then thoroughly washed out and emptied. The urine which collects in the bladder while the catheter drains the diseased

side represents the better side. If the entire bladder is diseased and there is but one thickened ureter and the symptoms are confined to the corresponding side, I think it entirely justifiable to catheterize this side, even though the regions of both ureteral orifices look the same. With these conditions and failure of the catheter to enter the thickened ureter, I would abandon an attempt at diagnosis through the bladder and depend upon a preliminary incision over the supposedly better kidney before attacking the side known to be diseased. It must not be forgotten that both kidneys and the bladder and only one ureter may be diseased. I have seen one such case in which a much hypertrophied and diseased left kidney and ureter were removed, dependence upon the integrity of the right kidney being placed upon the fact that the patient was in fair health, had a normal right ureter and a right kidney apparently normal on palpation. The bladder was so diseased that neither ureteral orifice could be found. In one week the patient died, having passed no urine; and on investigation the right kidney was found to be a multilocular cystic mass, with one caseous area in its cortex, while the ureter was normal.

I have used the Harris segregator and the Downes modification of this instrument, and am not favorably disposed toward them. It is only necessary to use the hand of a rubber glove as a receptacle in order to demonstrate how easily fluid leaks around the lever ridge at the bifurcation of the catheters, and a thickened diseased bladder floor is by no means as pliable as this rubber glove basin. Cathelin's rubber diaphragm separator is a more practical instrument, but this again cannot be depended upon in the cases in which it is most needed, for in a roughened uneven bladder floor the wire rim holding the rubber diaphragm must ride over the more projecting nodules and allow the intermingling of the urines in the sulci beneath the wire.

Tumor. The absence of tumor formation is not of diagnostic importance. In women the size of the right kidney

can usually be ascertained, while the left kidney may be considerably enlarged and still not be palpable. *A priori* one would expect the largest tumor in a case with perirenal abscess or collection of pus in the capsula adiposa. None of our cases showed this condition. A note on palpation is recorded in 26 of our cases. In 6 of these there was a visible or very large palpable tumor; 5 of these were either large pyonephrotic or multiple abscess kidneys, while the sixth was a kidney with caseous lobules opening more or less freely into the kidney pelvis. In this sixth case I had noted repeated variation in the size of the kidney. With elevation of temperature, chills, and pain in the left lumber region, the kidney became distinctly larger. In 10 of the 26 cases the note says the kidney is enlarged. In 5 the kidney was palpable, but of normal or diminished size. In 5 the kidney was not palpable. Enlargement is often due to perinephritis of a non-purulent character. The capsula adiposa becomes inflamed and thickened and forms a dense cartilage-like shell about the kidney. The kidney itself under these conditions may be enlarged, normal, or greatly diminished in size.

Ureter. A note on palpation for ureters is made in 19 cases. In 1 case the ureters are said to be free from tenderness, nothing being said as to palpability. In 18 cases one or both ureters are described as palpable, and the usual note is that they are thick and tender. The ureter can generally be palpated as it crosses the pelvic brim, and in the pelvic portion it may be palpated through the vagina and particularly through the rectum. Palpation of the kidney often causes pain and a desire to void urine. These symptoms are more frequently elicited on palpation of the ureter. The base of the bladder may be thickened and tender, particularly on the affected side, and its palpation may cause referred pain in the urethra.

General Condition. It is surprising that a patient may carry a badly diseased kidney and still possess good nutrition, a high percentage of hæmoglobin, and to all

appearances be in perfect health. Most patients, however, show some anæmia and give a history of having lost weight and strength. Some of our patients who are in excellent health to-day were brought to the hospital on a stretcher and were most hopeless-looking beings. Lack of drainage of the infected kidney, and bladder symptoms disturbing the patient's rest at night are the chief causes of a cachectic condition. The temperature in many of our cases was normal on admission and remained normal until operation. In others there was slight fever, often of the hectic type. In 7 cases the temperature was 103° F. or higher, and 1 case with a large pyonephrosis had a temperature on the day of admission of 106.2° F.

TREATMENT. If the disease is one-sided, as it is in about 90 per cent. of cases when seen reasonably early, operation without delay is indicated, for of 100 cases dying without surgical intervention, 51 per cent. are found to have double-sided disease.[1] As Israel points out, the infection of the second kidney is generally a matter of years, for the disease is usually diagnosed and operated upon at a late period, and is still found to be one-sided in 9 out of 10 cases. In our series the operation was at a period four and one-half years after the symptoms began, and the disease was probably unilateral in 92 per cent. We know from our pathological specimens that it is possible for tuberculous disease of the kidney to heal. We know from clinical experience that persons may live for years with both kidneys diseased. But we know also that one may live in comparative health for years with but one kidney, and that the seat of tuberculosis. If previous cryoscopy has shown renal sufficiency and a wide difference in the value of the two kidneys, it is indicated to remove the poorer kidney if this be the seat of predominating symptoms. Occasionally

[1] Israel, Chirurgische klinik der Nierenkrankheiten, 1901, p. 190. Vigneron, Thesis, Paris, 1892. De l'intervention chirurgicale dans les tuberculoses du rein.

one will find a portion of the poorer kidney in a condition of apparent health. In such a case the question of a partial resection must be considered. Partial resection is the operation of choice in the rare cases of double kidney with double pelvis and ureter, in which but one segment of the kidney and but one ureter show disease.

Nephrotomy. Simple incision and drainage is no longer used as a curative measure, and is not justifiable unless for special reasons which make nephrectomy inadvisable. As already inferred, both kidneys may be so extensively diseased that life would be precarious if either were removed, and yet one kidney only may be the seat of repeated distention with pus, causing fever, chills, loss of appetite, loss of rest, and causing secondarily a profound cachexia. In such a case free incision and permanent drainage of the more diseased kidney is indicated. Second, the patient may be too ill when first seen to bear a nephrectomy. Opening of the large pus kidney or of a perinephritic abscess in such cases is the only operation advisable, and this may be done under local cocaine anæsthesia or under general anæsthesia with nitrous oxide gas. After the patient improves sufficiently, complete nephrectomy or intracapsular enucleation of the kidney may be done; 4 of our patients had nephrotomy with a later nephrectomy. The removal of the kidney in 3 of these cases was accomplished by intracapsular enucleation, these being the only cases of the series in which this expedient became necessary.

Nephrotomy with drainage was the only operation in 3 of our cases; 2 of these had evident involvement of the opposite kidney and died from this cause, Case 4 within eleven weeks, and Case 5 after two years. Case 14 improved rapidly during six weeks in the hospital, and then insisted upon returning home. She is the only patient in the series whose ultimate condition we have been unable to learn. Generally in cases of large pyonephrosis or of perirenal abscess the greatest prominence is situated in the anterior flank region. Given a tumor in this region and inability

to make a diagnosis between gall-bladder, kidney, or other point of origin, it is probably indicated to approach the tumor over its most prominent portion. If the peritoneum is entered and the tumor found to be renal in origin this exploratory wound should be closed and the incision and drainage made in the lumbar route.

Nephrectomy. With normal bladder and the ureter showing no macroscopic changes, conservative surgery calls for simple removal of the tuberculous kidney. In such cases the renal end of the ureter may be tied with silk or catgut, a clamp set above the ligature, and the ureter burned across with the cautery. Or, still better, the cautery clamp may be used to sever and seal the ureter. If the kidney has been removed without contamination of the tissues the wound is closed for per primam healing, but if the kidney has ruptured and contaminated the field, or if one is not reasonably certain that the ureter is free from tuberculosis, a small iodoform gauze drain is inserted. Our series include 9 cases of nephrectomy (6, 13, 15, 17, 18, 20, 21, 28, 33). Case 21 died six weeks after operation, with evident involvement of the opposite kidney. The remaining 8 patients are living, and the wounds have healed in all but 3—Cases 17, 28, 33.

Nephrectomy and Partial Ureterectomy. By partial ureterectomy we generally mean the removal of the ureter down to the pelvic brim or as far as it can be followed through the wound made for the kidney extirpation. The term is used as well for those cases in which but a few centimetres are removed for microscopic examination. I believe the operation should be confined to the removal of 5 cm. or 6 cm., for if the ureter is not diseased nothing is gained by following it lower, and if it be diseased it is better to bring its upper end out on the skin surface (as suggested by Israel) than to leave a long tract for infection between the end of the ureter and the skin wound. If future ureterectomy through an inguinal wound is contemplated, a few centimetres of ureter to be released above the

pelvic brim will not materially complicate the operation. Nephrectomy and partial ureterectomy were done in 7 of our cases (7, 8, 9, 11, 19, 23, 24).

They are all living, and the wounds have all closed except in Case 24, whose wound is still slightly open after twenty-two months.

Nephroureterectomy. If the ureter is involved, as it is in the majority of cases when the patient comes for treatment, the ideal operation is the complete removal of both kidney and ureter. Dr. Kelly has developed a splendid technique in this operation, and I shall enter with some detail into the methods now in use by him and his associates. The operation was formerly done through what one patient describes in her letter as "an eighteen-inch incision," in other words, the patient was "quartered." We now use two short incisions; the operation is usually extraperitoneal, and may be done in favorable cases without cutting a muscle. The patient is placed in a prone or semiprone position with an inflated rubber bag (Edebohls) well up under the lower thorax. The lumbar incison begins in the angle formed by the erector spinæ muscle and the last rib, and is carried downward and forward 8 cm. to 12 cm. in a line about parallel with the direction of the twelfth rib. The incision is carried through the skin, subcutaneous fat, and deep fascia, and exposes the latissimus dorsi muscle, whose anterior border crosses the incision about midway. This muscle is grasped by skin retractors and drawn posteriorly, thus exposing the posterior border of the external oblique. The border of the external oblique is drawn anteriorly and the border of the internal oblique is exposed, together with the lumbar fascia, as it gives origin to the transversalis muscle. We have thus, without cutting a muscle or any important nerve or vessel, exposed the superior lumbar trigonum, a triangular fascial area with its base forming the arcuate ligament just inferior to the twelfth rib. An artery forceps is plunged through this fascia, and on spreading its blades the retrorenal fat appears

through the opening. This lumbar fascia is now cut or torn until its opening is of the desired dimensions.

If the inflammation is confined to the kidney this organ is usually seen sliding up and down in the wound, and after breaking through the capsula adiposa the kidney is delivered with more or less ease according to its size. If the capsula adiposa is the seat of inflammatory disease the kidney may be anchored deep in the wound and be hidden from view until this outer capsule is dissected free from the capsula renalis. In some cases with perirenal thickening the kidney is best delivered with its thickened capsule intact ; in others, the fatty capsule must first be stripped and the kidney then delivered. In still other cases, particularly in those where the kidney has been previously drained, the capsula adiposa has become so thickened and adherent that it is impossible to deliver the kidney, and one must first cut through both the fatty capsule and the thickened capsula renalis, and then do an intracapsular nephrectomy.

It is sometimes an advantage in the adherent cases to first sever the ureter. I have found it an excellent plan in these difficult cases to resect the twelfth rib; in fact, this is my rule in tuberculous kidney cases. In such cases the preliminary incision is made directly over the twelfth rib and somewhat more posterior than the incision just described, and the latissimus dorsi muscle is divided instead of retracted. This enables one to approach the inflammatory field by a more direct route, exposes any adventitious vessels, and greatly facilitates the control of the normal vessels after the kidney is delivered. To control the vessels it is possible in most cases to first entirely strip them of the fat about the hilum and to expose them for separate ligature. With a blunt instrument, best with a serrated spatula, one strips down the fat alternately on the anterior and posterior surfaces and then ties the vessels from the posterior exposure. When working on the right side the surgeon should bear in mind the

shortness of the right renal veins and the proximity of the inferior vena cava. After freeing the kidney the ureter is dissected loose down to the brim of the pelvis. The ureter is then clamped at about its isthmus and a ligature is placed somewhat below the clamp. The ureter is cut or burned through with the thermocautery, and its mucosa above the ligature is carefully cauterized. The clamp and ligature are both dispensed with and a clean field insured by using the Downes cautery clamp. If the operation has progressed to this point without contamination of the field by tuberculous material the wound may be entirely closed and the patient turned to the dorsal position for the ureterectomy.

The ureter incision is made parallel to and about 5 cm. above Poupart's ligament, beginning about opposite the anterior superior spine of the ileum and ending near the sheath of the rectus. With a little experience this incision can be made so that its ends lie between the main branches of the superficial circumflex iliac and the superficial epigastric vessels, so that one does not have to clamp or tie a vessel in reaching the muscles. The peritoneum is now exposed by cutting through the muscles or by separating them layer after layer in the direction of their fibres. On reaching the peritoneum this is pushed toward the median line, thus exposing the external iliac vessels running along the border of the true pelvis. Following these vessels toward the median line by sight, or preferably by touch, the ureter is found as it dips over into the pelvis at about the junction of the external with the common iliacs. The ureter goes with the peritoneum, and should be sought as the peritoneum is being pushed medianward. Occasionally the periureteral thickening holds both ureter and peritoneum in firm union with the fascial sheath of the iliac vessels. Having found the ureter at this point, one reaches above the pelvis brim for the upper end, which has already been loosened from above. Grasping the freed upper end the ureter is gently torn from the peritoneum in front and from the fascial attachments behind. Great care must be

exercised in freeing a strongly adherent ureter from the iliac vessels; if necessary, a portion of the periureteral tissue is cut free and left with the vessel sheath. If the ureter is densely adherent to the peritoneum it is best to free it by a sharp knife dissection, thus avoiding ragged tears into the peritoneal cavity. At times the deep pelvic portion of the ureter, or the broad ligament portion, is surrounded by a dense mass of thickened fat. If the patient is in fair condition this should be removed down to the bladder wall, although the uterine vessels of the corresponding side will have to be sacrificed. In the average case one can sever the ureter at the bladder without permanent injury to the uterine vessels. The inguinal wound is completely closed or it is drained according to the conditions of the individual case.

Our list comprises 13 nephroureterectomies (Cases 1, 2, 3, 10, 12, 22, 25, 26, 27, 29, 30, 34, 35). These patients are all living, and their wounds healed promptly, except in Case 25, whose wound still opens at times after fourteen months.

Nephroureterectomy and Partial Cystectomy. Resection of a diseased portion of the bladder together with the ureter and kidney was done in 3 cases. In Case 16, Dr. Kelly removed the left kidney through a lumbar wound, and the left ureter and a section of the bladder through a suprapubic median transperitoneal incision. The abdomen was closed without drainage. On the fourteenth day symptoms of general peritonitis began, there was no further passage of urine through the urethra, and the patient died on the fifteenth day.

In Case 31, I removed a small area of bladder disease with the urethra, and another ulcerated area, 3 or 4 cm. in diameter, from the vertex of the bladder through a suprapubic extraperitoneal incision. The urethra and urethrovesical region were removed through the usual extraperitoneal inguinal incision without tying the uterine vessels, these being simply displaced forward with a curved spatula. A cone of the bladder was drawn well into the

wound, and before the bladder was opened interrupted catgut sutures were set beyond the area to be resected. After removal of the ureterovesical area these sutures were easily tied. A small drain was inserted to the bladder suture, but there was no leakage. The patient is in excellent health and free from bladder lesions after almost two years. I performed a similar operation in Case 32, removing a portion of the bladder with the ureter without injury to the uterine vessels. In this case, however, the ureter was densely adherent to the peritoneum throughout the pelvis, and the patient's condition necessitated rapid work, resulting in a free tearing of the peritoneum. She had disease of the opposite kidney, and the operation was undertaken only because of the repeated blocking of the ureter, with resulting high fever, severe chills, and profound prostration. The operation of safety in her case would have been simple nephrotomy, but her social conditions were such that she desired to take extreme chances and be rid of after-treatment. For this same reason I closed a vesicovaginal fistula which had previously been made for treatment of a cystitis. The patient showed signs of uræmia from the time of operation, and died on the sixth day. Her death may have been hastened by peritonitis, due to leakage from the bladder wound, for after loosening the drain on the fourth day less urine was collected through the retention catheter. Several criticisms should be made regarding the conduct of this case. In the first place, the surgeon should not allow the wishes of the patient and her friends to carry him beyond what seems the only safe course in operating. This patient might still be alive if nephrotomy had been done. Second, in view of the resection of a portion of the bladder, the vesicovaginal fistula should have been left for drainage of the bladder. Third, in any similar case in which the peritoneum is opened the packing between the bladder and intestines should be generous in amount and should not be disturbed until firm intestinal adhesions are formed.

Treatment of the Bladder. I am not in favor of a partial resection of the bladder at the primary operation, except in rare instances. If the disease is confined to the immediate vicinity of the ureteral orifice and tubercles can be seen in the ulcerated area, and if the nephroureterectomy has progressed without opening the peritoneum, I think the bladder operation may be added; or, a vertex ulcer, situated where it can easily be reached by an extraperitoneal incision, may be removed. We know that some cases of bladder involvement are not specific and that they clear up after removal of the diseased kidney. In Case 31, I felt positive that the periureteral inflammation and the deep ulceration in the vertex were tuberculous, but the microscope showed them to be non-specific, and I doubt not that the cystitis would have quickly healed under ordinary methods of treatment. In Case 24, I felt certain from the appearance of the bladder that it was tuberculous; but the entire disease, covering one-third of the organ, has healed in six months without treatment.

I cannot agree with Motz,[1] of Paris, who thinks there is a tendency to spontaneous healing in tuberculosis of the bladder. He reports 8 cases of cure, 6 of which healed without vesical treatment, 4 after the removal of a tuberculous kidney. He bases his diagnosis on the existence of cystitis symptoms and the presence of tubercle bacilli in the urine; cystoscopic examination apparently having been made in but 1 case. Many of our cases with bladder symptoms and tubercle bacilli had perfectly normal bladders. When, in the cystitis cases, we get healing without treatment, or after the ordinary methods of treatment, we set them down as cases of secondary cystitis in which the bladder walls are free from invasion by tubercle bacilli. I have recently had enough experience with bi-weekly and weekly instillations of bichloride of mercury, in strength of 1 : 10,000 to 1 : 5000, to believe this drug has a place in

[1] Annales des maladies des organes génito-urinaires, July, 1903, No. xiv.

the local treatment of tuberculosis of the bladder, but outside of this I know of no treatment except complete excision of the diseased area.

In excising tuberculous areas in the bladder, both mucosa and muscle should be included, and if there is a suspicion that some of the disease remains, or if it is necessary to open into the peritoneum, a vesicovaginal fistula should be made. This places the bladder at physiological rest as long as may be deemed necessary. It makes the bladder suture safe and prevents infection and pressure ulcers that may occur with a retention catheter in the urethra. A small strip of iodoform gauze should lead from the bladder into the vagina for the first forty-eight hours to prevent the fistula from closing. The fistula may easily be closed under local cocaine anæsthesia when its purposes have been served. If future experience should demonstrate the desirability of removing a portion of the bladder with the ureter, this operation in multiparæ and women with large vaginæ will probably be performed through the vagina. After freeing the ureter down to the uterine vessels, a finger beneath the end of the ureter makes a safe guide for puncture through the vaginal wall with sharp scissors. The ureter is dragged down through this puncture opening and the vaginal wound is enlarged according to the area of bladder to be resected. After resection of the diseased area the deeper portion of the bladder and vaginal wounds may be closed, leaving the portion nearest the internal urethral orifice open for the purposes of a vesicovaginal fistula. The ureterectomy was finished through the vaginal route in Cases 2, 3, 22, and 25. In Case 22, I removed a considerable area of thickened muscle of the bladder wall with the ureter, and opened into the bladder mucosa.

Treatment of the Ureter. While, as stated above, the ideal operation in case of thickened ureter is nephroureterectomy, we are not justified in adding the ureter operation unless the patient is in fair condition. We have not yet had enough experience to say just how much or how little

harm may come from leaving a diseased ureter *in situ*. Case 23 suffered for some months after her kidney was removed from intermittent abscess formation in the pelvic portion of her ureter. After days of fever, malaise, and pain the accumulation of pus would discharge into the bladder, and the patient would experience instant relief. *A priori* one would suppose that the presence of a diseased ureter would influence the bladder disease. And it probably does at first, but we know that physiological rest for the ureter is followed in many cases by quiescence of the tuberculous process and atrophy of the organ. Of the 4 cases known to have a bladder lesion at present, 2 still carry the diseased ureter and have a lumbar fistula. Of the 11 cases with bladder symptoms only 3 have the ureter.

An analysis of our cases throws some light upon the problems of wound healing. Of the 9 nephrectomy cases, 1, Case 21, died. Case 6 is reported in good health, but nothing is said as to wound healing. Case 13 was closed at operation and healed by primary union. Cases 15 and 18 healed before they left the hospital. Case 17 is still open after three and one-half years, the rib probably being infected. Case 33 is open after seventeen months, and Case 28 is open after fourteen months, a piece of gauze having been discharged from her wound after five months.

Of special interest are the cases of nephrectomy and partial ureterectomy, because of the opportunity to examine the ureter microscopically. Of the 7 specimens, 2 were not examined, 4 were tuberculous, and 1 showed a chronic ureteritis. Of the cases showing a tuberculous ureteritis, Case 19 healed at once before leaving the sanatorium. Cases 8 and 23 closed after two years, and Case 24 is still open after almost two years. Case 9, with chronic ureteritis, healed in four weeks.

From the 14 cases of nephroureterectomy, 10 ureters were tuberculous, and 4 showed chronic ureteritis. In the 4 cases showing chronic ureteritis the wounds closed promptly in Cases 1 and 26, while in Case 12 there was

granulation for six months, and in Case 2 for five years. The 10 tuberculous ureter cases closed soon, except Case 25, whose lumbar wound is still granulating after fourteen months. The tardy healing in Cases 2 and 12 can be explained only on the supposition of wound infection from the kidney during the operation. Of the 3 cases of nephro-ureterocystectomy, Cases 16 and 32 died, and the wounds in Case 31 healed promptly.

Of the 23 cases in which the whole or a part of the ureter was removed, the ureter was examined microscopically in 22, and of these, 17 were tuberculous, while 5 showed chronic inflammation. From the above analysis it appears, first, that tuberculosis of the ureter exists in a large proportion of cases of tuberculosis of the kidney; second, that a wound may close rapidly after the partial removal of a tuberculous ureter, or it may suppurate for years after the complete removal of a non-tuberculous ureter; but that, as a rule, the partial removal or the leaving of a tuberculous ureter is followed by months or years of suppuration, while the complete removal results in rapid closure of the wounds.

After-treatment. In all cases of abdominal operation it has been Dr. Kelly's practice for a number of years to give the patient a litre of salt solution before she leaves the operating table. This is given either as a high enema, a subcutaneous infusion, or it is left in the peritoneal cavity. This allays thirst to a great extent and flushes the kidneys, the patient passing about the normal quantity of urine in the first twenty-four hours. In all kidney operations this operation infusion is supplemented by enemata of salt solution given every four to six hours for the first day or two. These enemata are small, containing from 200 c.cm. to 600 c.cm. of fluid, to which nourishment may be added. The enema should be of body temperature or slightly warmer, and it should be given slowly, preferably by means of a rectal tube and gravity funnel.

In case oliguria or uræmic symptoms develop after operation, the amount of fluids should be pushed and the patient

treated much as one would treat acute Bright's disease. The skin and bowels should be kept active. The patient may be kept in blankets. Heart depressants must be avoided after a severe operation. Diuretics are indicated and are preferably given with the enemata. The infusion of digitalis is one of the most useful. I have had most gratifying results with the diuretic pill, composed of squill, digitalis, and calomel, one grain of each. This pill acts well on both the bowels and kidneys.

Summary of Results. One patient (Case 14) has not been heard from since leaving the hospital.

Five patients (Cases 4, 5, 16, 21, 32), or 14 per cent., have died, 2 (Cases 16 and 32) from the results of the operation. Cases 4, 5, 21, and 32 had involvement of the other side, the first three dying from this cause.

Two patients now living, after, respectively, eight and fourteen years (Cases 2 and 3), may have tuberculous infection of the remaining kidney.

Eleven patients (Cases 3, 9, 10, 12, 23, 24, 25, 27, 28, 33, 34) still have bladder symptoms, or are known to have a bladder lesion. The elapsed time since operation in these cases has been: fourteen years, 1 case; five years, 2 cases; four years, 1 case; two years, 2 cases; from eighteen months to six months, 5 cases. All but 1 of these patients are in good general health, 5 of them reporting better health than they have known for many years.

Case 18 still has partial incontinence of urine, due to treatment of the urethra before she was admitted to the sanatorium. Her general health is excellent after three years.

Two patients (Cases 29 and 30) on dismissal, six months ago, had colon bacillus infection of the remaining kidney, but they had very little pus in the urine, no symptoms, and considered themselves well. Case 29 was seen December 8th. She had gained thirty pounds in weight; the bladder was normal; but the colon bacillus infection was still present in the remaining kidney.

Ten patients (Cases 1, 6, 8, 13, 19, 20, 22, 26, 31, 35) are reported or known to be in perfect health. The elapsed time since operation has been: eight years, 1 case; six years, 2 cases; five years, 1 case; three years, 2 cases; two years, 2 cases; one year, 1 case; six months, 1 case.

Case 7 was operated on for pelvic and abdominal tuberculosis in June, 1902, six years after her kidney operation. A letter to Dr. Kelly, in December, 1903, from California, reports fair health and the pursuit of field work in botany.

This gives us 25 out of 35 cases, or 70 per cent., to be classified as enjoying either fairly good or excellent health.

Cases 11 and 15 are in poor health (each after five years), with evidence of chronic interstitial nephritis.

Cases 17 and 33 have lung tuberculosis, but Case 17 is doing heavy work as a maid, and Case 33 (already mentioned as having cystitis) is in apparent good health.

General Summary. Tuberculosis of the urinary system is a surgical disease, being, as a rule, unilateral and often the only focus of tuberculosis in the body.

If the disease is bilateral and there are no pronounced symptoms referable to the kidneys, the treatment should be that usually accorded tuberculosis of the lungs, viz., suitable climate, nutritious diet, and proper regulation of the patient's rest and exercise; but if one or both sides begin to cause marked, local, or general manifestations, surgical intervention is often of great benefit.

In case of bilateral disease, or in associated disease of the lung, the anæsthetic is of great importance. Local cocaine anæsthesia may be used for nephrotomy, and nitrous oxide gas for nephrotomy, nephrectomy, or nephroureterectomy.

Thickened ureters are generally tuberculous, and should be removed with the kidney if the patient's condition justifies.

Bladder disease in these cases is often non-tuberculous, and removal of the diseased area should not be attempted at the first operation. If the bladder fails to heal within

a year under ordinary methods of cystitis treatment, the disease is probably tuberculous, and if not occupying more than half of the bladder it should be excised.

DISCUSSION.

Dr. Richard Douglas, of Nashville (asked to open the discussion on this paper).—I am scarcely able to discuss this subject in the light of a large experience, yet I have had something to do with tuberculosis of the kidney. I am pleased that the essayist has called attention to the relation between bladder tuberculosis and that of the kidney. In my experience vesical tuberculosis is a secondary trouble in the female, usually the sequel of renal tuberculosis. I have nephrectomized five cases for tuberculosis. Seven years ago I did a nephrotomy, opening several tuberculous abscesses in the kidney. This patient was the wife of a prominent physician of Morriston, East Tennessee, and she is now quite well. A recovery after so incomplete an operation as nephrotomy is quite exceptional.

We all have observed how quickly the vesical ulceration heals after the removal of the kidney. Weir had an unusual opportunity for observing this. The essayist has alluded to the fact that several of the tuberculous kidneys were movable. May not the preternatural mobility of the kidney with its variable circulation act as a predisposing cause?

In the diagnosis of tuberculosis of the kidney we must bear in mind that the organ may be riddled with abscesses and yet be very movable. I recently removed a tuberculous kidney that glided about very freely in the right zone of the abdomen. Precise diagnosis entails many methods, all of which should be employed. The cases reported by the essayist are of immense value, for they are the only series that I know of in American literature in which the most modern methods of diagnosis were employed.

In conducting our investigations with a view of operation, we must not forget to test the efficiency of the other kidney. It is not sufficient to determine that it is free from tuberculous inflammation; we must know that it possesses efficiency. European surgeons, Roux, Casper, Israel, and others, I think, have less mortality after nephrectomy than American surgeons as a class. The only explanation that can be offered (for they certainly have not superior technique) is the thoroughness of their investigations to ascertain the efficiency of the other kidney. The paper presented to us is of immense value. The cases are well analyzed, and the points emphasized are salient ones under the subject of Renal Tuberculosis. Dr. Hunner deserves the thanks of the Association.

Dr. Maurice H. Richardson, of Boston.—After listening to this paper I feel very much encouraged in what has been to me a discouraging disease. The discouragement has come from the lateness of the surgical intervention, as the reader of the paper has emphasized. If we could get cases of unilateral renal tuberculosis and operate on them early, I believe the results would be encouraging. The number of cases we have of genito-urinary tuberculosis is large, especially in men. We have come to look upon genito-urinary tuberculosis in the male —usually discovered first in the testicle—as a most formidable disease. Indeed, I have come to look upon it as practically hopeless, and that castration, which is the most obvious operation, or only operation to be done in the male, is performed too late, the inference being that the moment the disease is seen, it has already involved the seminal vesicles or the bladder. Nevertheless, I have been surprised at times to learn that some of the cases that have been pronounced hopeless and incurable, and in which nothing has been done, have lived six or eight years afterward in apparently robust health. This fact encourages me very much in cases of tuberculosis in the male. If this is true, and if we can get in the male this great improvement and apparent cure from hygienic treatment, we have reason for considerable encouragement in cases of tuberculosis in the female. In a large number of these cases, as the essayist has shown, the disease is confined to one kidney, and operations are attended with a surprisingly large number of recoveries.

I want to mention the case of a young girl who had tuberculosis of the kidney. The diagnosis was unmistakable. I saw the patient in consultation with a specialist in genito-urinary work. In this case the patient made a surprising improvement under simple hygienic treatment, although I must confess that I was inclined to radical operation. Personally, I believe very strongly in attacking tuberculosis in the most radical manner, particularly of the kidneys, attacking the kidney and the ureter by total extirpation. I have felt much discouraged by my own bad end results from nephrectomy; but the unfavorable results must not be attributed to the method or methods adopted, but to the lateness of surgical intervention.

I have looked up my cases. The number is small, but the immediate results from operation have been good. I remember very well one of my early cases in which the removal of the kidney and the ureter was extremely successful; but the patient died of tuberculosis of the lungs.

In a recent case I found the ureter compressed in a mass of caseous material at the lower border of the kidney, with complete hydronephrosis. The removal of the kidney and ureter in this case was followed by brilliant recovery. We could not, however, demonstrate tuberculosis. We find a great deal of

difficulty in proving the existence of tuberculosis. We all know it is hard to eliminate the presence of tuberculosis by examining the urine, and even by making inoculations in guinea-pigs. I have been surprised to see the value of exploration and nephrectomy in apparently very serious cases.

Dr. E. A. Balloch, of Washington, D. C.—I should like to ask Dr. Hunner a question. In these cases, where the kidney, ureter, and bladder are all affected, and a nephrectomy or nephroureterectomy is done, to what extent does the condition in the bladder clear up afterward under treatment?

Dr. Stuart McGuire, of Richmond, Va., was asked to discuss the paper. He said: I am much obliged to you, Mr. President, for the invitation to speak on this subject, but my work has been very limited. One case in Dr. Hunner's paper was referred by me to Dr. Kelly, because I felt I was unable to deal with it properly. I am glad to hear from the report that the results in that case have been gratifying.

Dr. Hunner (closing).—In answer to Dr. Balloch's question, regarding the results in those cases in which the bladder is infected, I would say that is the one discouraging feature of our whole work, getting rid of the bladder tuberculosis, particularly if the cases are like the one Dr. McGuire has mentioned, in which there was universal ulceration of the bladder. The kidney in his case was removed, leaving the ureter. A vesicovaginal fistula was made and the bladder has cleared, so that now three-quarters of it is normal, but the other quarter shows decided inflammation. This case is not put in the list as cured, but among the eleven cases that still have bladder symptoms.

I want to emphasize again the point that not all cases of ulceration of the bladder are tuberculous. In one of my cases I excised the ulcerated portion around the ureteral orifice together with the ureter. I made a short suprapubic, extraperitoneal incision and excised the ulcer at the vertex of the bladder, and felt sure both these ulcers were tuberculous, but they were not. Tuberculous ulceration of the bladder does not clear up under ordinary treatment. It is discouraging to deal with. Caspar, of Berlin, has recommended the use of instillations of 1:10,000 up to 1:1000 bichloride of mercury. This is helpful in some cases. But tuberculosis of the bladder usually needs the knife to get rid of it.

Dr. Douglas wonders if the preternatural mobility of one kidney has anything to do with the etiology of the disease. I thought on beginning this investigation that most of our cases would prove right-sided because of lowered circulation incident to movable kidney, but was rather surprised to find seventeen cases right-sided and eighteen left-sided; so apparently the mobility of the kidney does not have much to do with the etiology.

I did not mean to convey the impression that nephrotomy is contraindicated in these cases. It is a useful operation in cases of

bilateral renal disease. It is not used any longer for the purpose of effecting a cure.

Dr. Richardson said that he had great trouble in diagnosing to a certainty tuberculosis of the kidney. I will say that I have looked for tubercle bacilli in a great many cases, and where I have failed to find them the case has proved to be other than tuberculosis of the kidney. We ought to find tubercle bacilli in practically every case of renal tuberculosis. My method of detecting tubercle bacilli will be found in my published paper.

A CASE OF BILATERAL DIFFUSE VIRGINAL HYPERTROPHY OF THE BREASTS.

By George Ben Johnston, M.D.,
Richmond, Va.

It is worthy of comment that while the glandular structure of the female breast is so remarkably subject to malignant changes that simple hypertrophy of the breast tissues should be such an extreme rarity as to amount to a surgical and pathological curiosity. This is the more notable in that the glandular fibrous and lipomatous tissues of breast structure are all individually prone to various degrees of hyperplasia. The case which I report here, the second with which I have met during the past few years, is the thirty-first reported case of true hypertrophy of the breasts in the virgin, and the forty-fourth, including thirteen cases occurring during pregnancy.

Of 2422 cases of mammary neoplasm admitted to Middlesex, University College, St. Bartholomew's and Thomas' Hospitals, during a period of twenty-one years there were only seen 6 cases of true diffuse hypertrophy. At St. George's Hospital only 2 cases were seen in thirty-five years, and no instance has as yet gone on record at the Johns Hopkins Hospital.

Kirchheim,[1] in his excellent review of the entire subject, divides bilateral hypertrophy of the female breast into two forms:

1. Virginal hypertrophy, usually beginning about the time of puberty, and progressing independent of pregnancy.
2. Gravidity hypertrophy, developing during pregnancy.

In the development of this strange deformity there are but these two etiological factors apparent: puberty and pregnancy. Neither trauma, disease, nor heredity seems to enter into its causation. The virginal form is essentially a disease of puberty, as 25 of the 30 cases occurred between the ages of eleven and nineteen years. The onset may be acute, but in the virginal form the progress is usually one of slow development during several years, subject to acute exacerbations, such as at the beginning of menstruation, or at other times which lack any apparent causal relation. The acute onset is common in the gravidity form, the hyperplasia developing during the progress of pregnancy, and frequently disappearing to a greater or less extent after parturition. Zweifel[2] reported a case of a primipara who had had unusually small breasts before pregnancy. At the sixth month the left breast was twenty-two inches and the right nineteen inches in circumference. Both contained colostrum. Wenckel[3] reports another case where the breasts grew to the umbilicus in about eight months.

Following parturition the breasts may return permanently to near normal size, or may enlarge again with each successive pregnancy. The enlargement does not always appear at the first pregnancy, for example, in Dietel's[4] case the hypertrophy occurred during the eighth pregnancy of a woman thirty-five years of age, whose breasts had previously remained normal.

In the gravidity form lactation is, as a rule, normal, while a discharge is usually absent in the virginal form, though the presence of colostrum has been reported in a few cases.

One case[5] is reported of a woman whose breasts had begun to enlarge at puberty and had attained to such a size at sixteen years of age that they were supported upon the thighs when sitting. They remained stationary for eight years, then she married in spite of her deformity, and though twice pregnant, could not suckle, though the breasts became turgescent. When not pregnant the breasts,

like "shrivelled masses of skin traversed by enormous bloodvessels," hung to the knees.

The size to which this hypertrophy may attain varies considerably. Mr. Jowers, of Brighton, recently reported a case of a girl, aged fifteen years, where one breast weighed four and one-half pounds and the other two pounds; while in other cases reported the breasts weighed ten to fifteen pounds; and Borellus,[6] in 1676, cited a case where an ordinary sized woman supported, in bags hung around her neck, enormous breasts weighing thirty pounds apiece; and Porter,[7] in 1892, reported a case where the combined weight of both breasts was sixty pounds.

While in itself benign, this enormous hypertrophy seriously involves the comfort and health of the patient, and, finally, affords avenues for secondary infection, to which the weakened system may readily succumb. The general nutrition may be impaired, respiratory and cardiac distress are common, and the breasts themselves are liable to gangrenous sloughing or abscess formation. Wardropp[8] reports the case of a woman whose enormous breasts so prevented breathing that amputation was imperative. They were successfully removed, the wounds healing by granulation.

Hey[9] cites a case of a girl with marked spinal curvature from the weight of her pendent breasts; and in Porter's case, previously mentioned, the woman had become anæmic and emaciated and suffered severe respiratory distress. These breasts were separately removed, with success, at three weeks interval.

Houston[10] reports the case of a negress, aged sixteen years, where the breasts sloughed and caused her death. Post-mortem, the right breast weighed twelve pounds and the left twenty pounds.

Therefore, as the disease is ordinarily one of progressive development, radical measures are indicated, except in those cases, mostly of the gravidity form, which may show definite tendency to spontaneous recovery. Here, support and compression may be tried.

The operation should not be a dangerous one if hemorrhage is carefully controlled. Roger Williams[11] collected notes of twenty-two amputations on sixteen patients, with but one death, and that from hemorrhage. The shock consequent upon the division of the nerves involved in so extensive a denudation may render separate amputations of the breasts at several weeks' interval advisable. Nerve cocainization, as advised by Crile and Cushing in amputations, would scarcely be practical here, owing to the number and fine division of the nerve branches. Hemorrhage may be controlled by catching the vessels one by one as they are divided, or, as in Porter's case, using pins and tourniquets similar to Wyeth's method of bloodless amputation.

The histological picture is a diffuse hypertrophy of all the breast structures, most marked in the interlobular fibrous stroma, and, as Kirchheim's study shows, presents in reality an adenofibroma. He suggests for the disease the term "diffuse adenofibroma." All unilateral hypertrophies, according to Bloodgood, are in the nature of intercanalicular myxomata, and therefore should not be classed with the bilateral hypertrophies.

My case is that of a white girl, virgin, aged sixteen years, four feet ten inches tall, weighing 112 pounds.

Family History. Negative as to the history of any similar deformity. History of phthisis on the maternal side.

Personal History. This shows ordinarily healthy child previous to onset of present deformity; usual diseases of childhood; acute articular rheumatism at three years of age. Menstruation began at fourteen years, usually of seven days' duration; interval usually twenty-two or twenty-three days, occasionally two months. Slight dysmenorrhœa.

Present Illness. First noticed that breasts were becoming of unusual size at about twelve years of age. They grew slowly, and as nearly as she can remember were about as large as two fists at fourteen years, when menstruation began. After this the growth was more rapid. At each menstrual period the breasts would become sore and some-

what tender. One year before admission to the hospital the right breast developed two abscesses at three weeks' interval, which ruptured spontaneously, discharging freely. About a month before admission the growth took on renewed activity, the size and weight of the breasts becoming rapidly so great as to seriously interfere with locomotion, and also causing respiratory distress after unusual exertion.

On admission examination showed a well-nourished girl; mucous membrane and skin rather pale; lungs negative; heart hypertrophied; systolic murmur at pulmonary area, sounds otherwise clear; pulse markedly irregular in force and rhythm.

Vaginal examination, under anæsthetic, showed virginal outlet; uterus and appendages normal in size and position.

Urinary examination negative.

The breasts hung from the chest wall at about the fourth rib and reached to a point just above the symphysis pubis, the nipple is flattened and stretched.

The substance is soft and of similar consistence to that of a well-nourished multipara's breast, the glandular masses scattered throughout being distinctly palpable.

The breasts are almost symmetrical, with the exception of a lobular division at base of left breast of the same general structure as the main tumor. Two small scars near the right nipple indicate the site of former abscesses.

The anterior posterior circumference of			left breast,	$19\frac{1}{4}$	inches.
"	"	"	right "	$21\frac{1}{4}$	"
The superior inferior circumference of			left "	32	"
"	"	"	right "	31	"

The patient remained in the hospital three weeks awaiting operation, owing to the development of a bronchitis. During this time the breasts continued to grow, while she lost in general weight and strength.

The operation was performed under ether anæsthesia, and occupied thirty-five minutes, the left breast being removed first, followed immediately by the right. The breast was held above the field of operation and the amputation carried

on as rapidly as the vessels could be caught by assistants. Care was taken to leave sufficient skin for easy linear closure over the wounds. The amount of hemorrhage was inconsiderable, and the patient left the table in good condition. Healing was per primam, and the patient was up and about in six days.

The pulse became regular during operation, and no irregularity could even be detected after the third day.

Patient immediately began to gain weight, and the improvement in her general condition was marked.

I am indebted to Dr. Joseph C. Bloodgood, of the Johns Hopkins Hospital, for the following full pathological description of the specimens. It is interesting to note, in connection with Kirchheim's views concerning the nature of this disease, that a true encapsulated adenofibroma should be attached to the base of the left breast.

Diagnosis. Bilateral diffuse virginal hypertrophy of the breasts, encapsulated ; isolated adenofibroma in connection with the left breast.

Weight: left, 10.50 pounds ; right, 7.75 pounds ; total, 18 pounds.

In the skin covering the breasts there is no evidence of scar formation, the nipple is not prominent. In the larger breast, the left, it can scarcely be made out. In both breasts there is no sharp demarcation between the areola and the surrounding skin. The skin is thrown into wrinkles and feels distinctly hypertrophied. This hypertrophy of the epidermis and derma is confirmed by gross and microscopic section. There is therefore distinct elephantiasis of the skin. The wrinkling may be due to its preparation in formalin and alcohol.

The surface appearance is shown in Figs. 1 and 2. In Fig. 1 (left breast) the large and distinctly encapsulated tumor corresponding to the axillary projection of the breast is also shown.

Slight elephantiasis and pigmentation were observed in Kirchheim's case of virginal hypertrophy.

The posterior surface of the breast is shown in Fig. 3 (left breast). In this photograph the encapsulated tumor noted above is shown. The capsule is smooth and is not covered with any fat. Toward the breast it is covered with a little fat. The base of the breast in the majority of places is covered with fat, but in many spots the smooth, white, dense, breast tissue can be seen and felt without any adipose covering. In the photograph these areas are smooth and white, while the adipose tissue is lobular and gray.

Cross-section through Breast and Nipple. (Fig. 4.) Both epidermis and derma are hypertrophied. The hypertrophied skin can be separated from the breast, and is connected with it by loose, cobweb, white connective tissue. This tissue is œdematous, full of serum. This picture indicates that the subcutaneous fat is entirely atrophied or almost completely replaced by breast tissue. Beneath the skin and this areolar tissue noted we see the typical picture of a diffuse hypertrophy of the breast. In the outer zone most of the fat is replaced by breast tissue. In the majority of places the breast tissue has completely replaced the fat. Throughout the breast there are small islands of fat surrounded by breast tissue. The fat between the breast and the pectoral fascia is almost completely replaced by breast tissue. The breast tissue is composed chiefly of opaque, whitish, firm tissue, which resembles the ordinary white fibrous tissue in scar or chronic inflammations. Scattered in this white fibrous stroma we see a few holes which admit a fine needle to various depths. These are sections of dilated ducts. More are found beneath the nipple. The largest one at some distance from the nipple is shown in Fig. 4. Dilatation of the ducts is, however, not a prominent feature. There are no cysts. Splits and crevices so frequently observed in adenofibroma are not seen. Throughout the white fibrous stroma we see minute yellowish dots and lines, some with a minute lumen; these undoubtedly

represent the parenchyma of the breast. In areas chiefly following the ducts in the centre of the breast the tissue is very œdematous, filled with serum. In the base there are a few areas in which one can make out dots and lines, evidently bloodvessels.

The hypertrophy therefore is chiefly fibrous and of the interlobular fibrous stroma. The tissue is not vascular, the parenchyma, however, is more prominent and greater in amount than in a normal breast of a girl of this age.

Gross Section of the Tumor Connected with the Left Breast. The size of this tumor and the relation to the breast is shown in Fig. 3. It is distinctly encapsulated and separated from the breast proper by loose connective tissue and fat. The capsule is smooth, but cannot be separated from the tumor. On section the appearance of the tumor differs very little from the hypertrophied breast, except it contains no included islands of fat; there are more dilated ducts and more of the dots and lines filled with a yellow, granular material representing the parenchyma, more red lines and dots representing vessels, and, in a few areas, of definite hemorrhage. The naked-eye appearance is well illustrated in Fig. 5, and corresponds to the characteristic gross picture of an adenofibroma.

The gross pathology of the right breast is similar to that of the left just described.

Gross Pathological Diagnosis. Bilateral, diffuse, virginal hypertrophy of breast. Encapsulated isolated adenofibroma in connection with the left breast.

The gross pathological picture corresponds to Kirchheim's case of virginal hypertrophy, except in this instance the parenchyma is more marked. In Kirchheim's case the hypertrophy was of longer duration.

Microscopic Pathology. Section 1. Skin and breast tissue immediately beneath; no fat. Section 2. Five inches from nipple.

With the naked eye we can see the thickened epidermis stained with hæmatoxylin—the derma and zone of loose

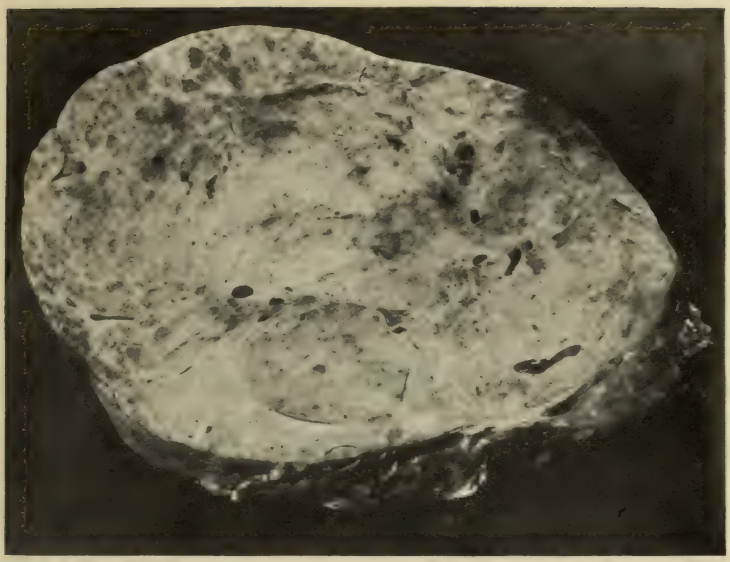
Fig. 1.

Fig. 2.

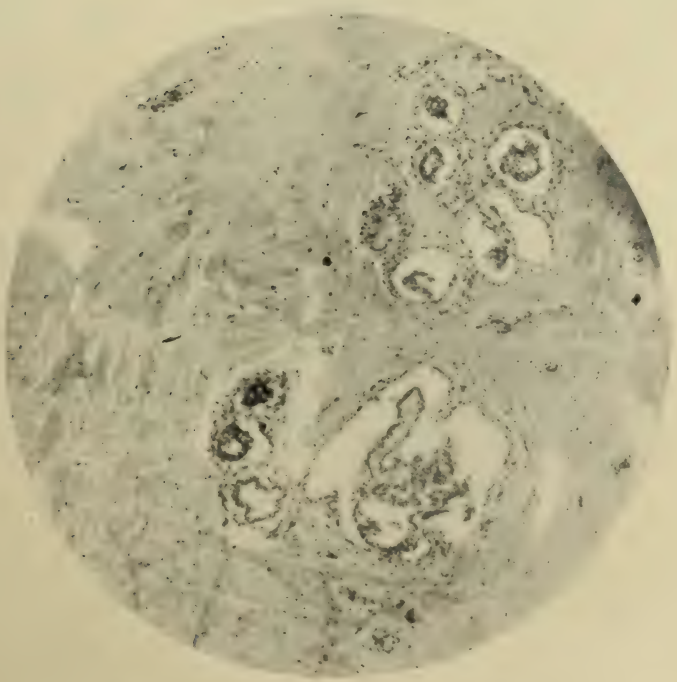
Fig. 3.

Fig. 4.

Fig. 5.

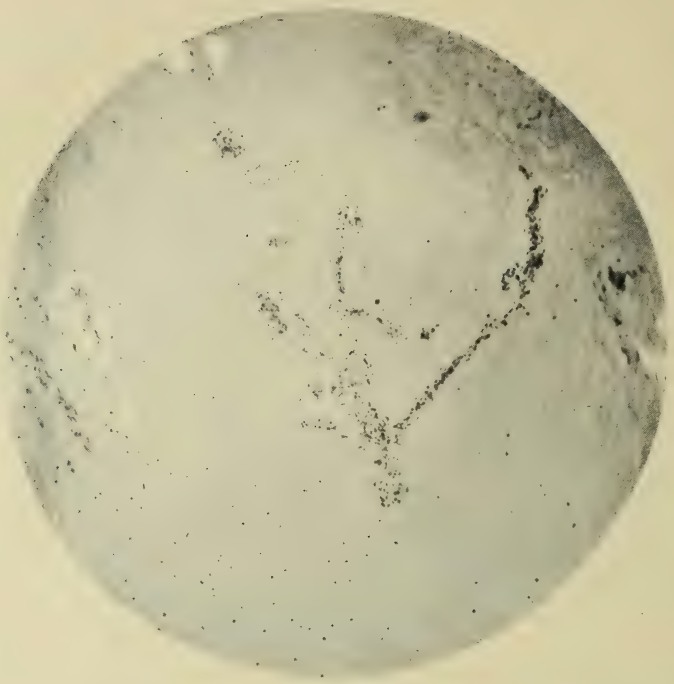


Sec. 1.



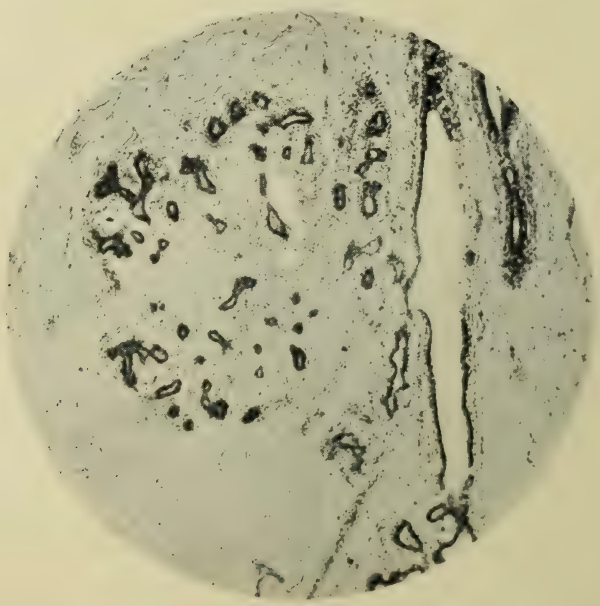
Hypertrophied mass of connective tissue surrounding acini. × 15.

Sec. 2.



Islands of fat Small round-cell infiltrate. × 25.

Sec. 3.



Groups of glands. × 25.

areolar tissue are stained with eosin—beneath which the distinctly circumscribed breast tissue composed chiefly of a dense tissue taking the eosin stain in which we see small areas taking hæmatoxylin stain; in some of these latter areas there are minute cavities.

With a Bausch & Lomb one-half projective and "C eye-piece" we notice that the epidermis is lightly hypertrophied, the derma contains more fibrous tissue than normal. Hair follicles, sweat glands, and sebaceous glands are absent. No subcutaneous fat. The areolar tissue beneath the derma in some places is œdematous. The breast tissue is composed chiefly of the interlobular stroma, which takes the eosin stain deeply. Throughout this tissue we see sections of ducts, three to five or more, surrounded with the intralobular stroma, which takes the eosin stain lightly and looks whitish; the intralobular stroma is more cellular than normal. The epithelial cell lining the duct is usually separated from the basement cell. In some of these the cells have fallen out, leaving a cavity, a histological change seen in chronic interstitial mastitis with parenchymatous atrophy. In some ducts there is proliferation of the epithelial cell with degeneration. This microscopic picture corresponds to Kirchheim's case and the ordinary picture of adenofibroma.

Section 2. From the very œdematous breast tissue, three inches beneath nipple, in centre of breast.

With the naked eye we can see that in Section 2 there is scarcely any parenchyma as compared with Section 1, and there are a good many light areas in the eosin-staining fibrous tissue suggesting œdema.

Low Power: The fibrous tissue contains fewer hæmatoxylin staining nuclei than in Section 1, and there are spaces suggesting separation, with serum. In some places the fibrous tissue takes the eosin very faintly. Sections of the parenchyma do not differ from those described in Section 1.

Section 3. Breast tissue having similar naked-eye

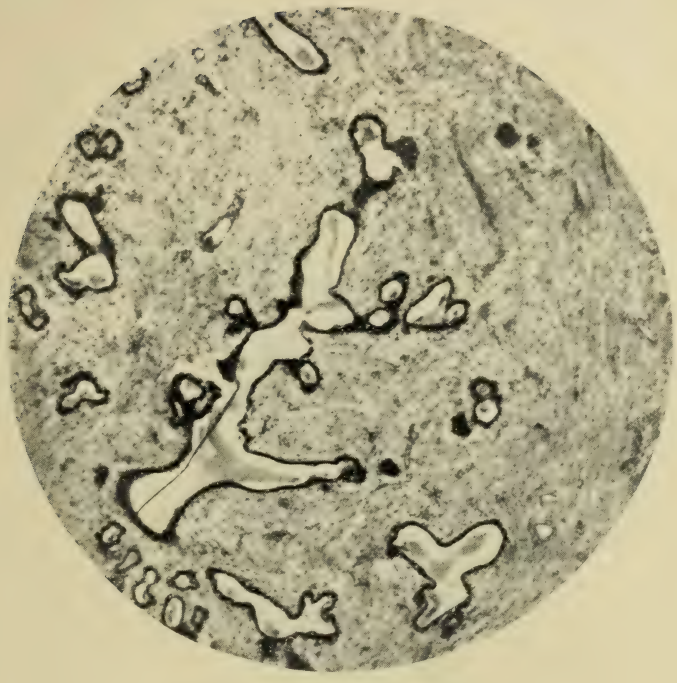
appearance to Section 1 at base of breast. With naked-eye less parenchyma than Section 1, but more than Section 2. This section differs from Section 1, with low power, very little. The stroma is more œdematous, similar to Section 2. There are but a few larger ducts, but, on the whole, very little parenchyma.

This microscopic study demonstrates that we are dealing with a fibrous hypertrophy. However, since we find sections of parenchyma in the sections beneath the skin, we must conclude that parenchymatous hypertrophy accompanies the hypertrophy of the stroma. As there is less parenchyma in the older portions of the breast toward the centre of the breast, and more in the breast infiltrating toward the skin, we must conclude that later there is parenchymatous atrophy. Signs of chronic inflammation are present only, and here slightly, in the intralobular stroma, which is not hypertrophied.

Section 4. Tumors connected with left breast. Corresponding with the naked-eye appearance of the tumor is that of the stained section; more dilated ducts, more parenchyma.

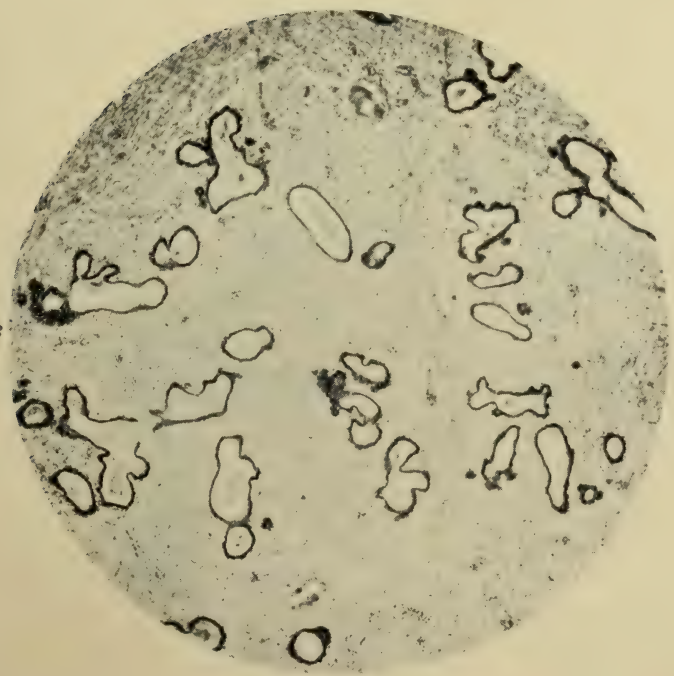
With the low power of the microscope this is again confirmed. In addition the interlobular stroma is more cellular and looser, the dilated ducts are filled with a degenerated material, both larger and smaller ducts in places show proliferation of the epithelial cells; this, however, is not a marked feature. There is distinct ectasia of the smaller ducts, and their branching is easily made out. The histological picture corresponds to the early stage of adenofibroma, and corresponds exactly to P. No. 3210, an adenofibroma, which has had a similar naked-eye appearance to this tumor, and which was removed from a girl about the same age.

Histologically, therefore, the tumor differs from the diffuse hypertrophy chiefly in the presence of more parenchyma.



A

Adenofibromatous duct. × 20.



B

Group of acini. × 20.

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DISCUSSION.

DR. MAURICE H. RICHARDSON, of Boston.—I do not see that there is very much to be said on this subject, as the essayist has fully covered it. However, as the President has asked me to speak, I will say a few words. It is a very unusual condition. I have seen hypertrophy of the breast, but never in any cases of my own which required operation. It might be interesting to tell you briefly the history of Dr. Porter's case. I think Dr. Johnston says that the breasts in his case weighed eighteen pounds. In the case of Dr. Porter the breasts were enormous. The woman came from Nova Scotia. She was living in a back country where there were no physicians or surgeons, and consequently the breasts were allowed to grow to this enormous size. The patient fully recovered from the operation performed by Dr. Porter, but subsequently died of pneumonia.

DR. HENRY T. BYFORD, of Chicago.—I had supposed, before hearing this paper, that cases of hypertrophy of the breast were more common, particularly in tropical countries. I still think they are, but the reason why more of them are not reported is because patients will bear large hypertrophied breasts without apparently any great inconvenience. I recall one case in my own experience in which the breasts were about this size (referring to the case of Dr. Johnston). They had been nearly this size for years. The woman was near the change of life, but consulted me when she was pregnant. She had been able to bear the breasts comfortably by wearing the proper corset until pregnancy brought

about still greater enlargement. She then began to suffer and insisted on having them removed. But I persuaded her that just at that time it was not wise to operate. She finally decided not to have an operation. Subsequently the breasts became reduced in size, and she did not seek an operation.

Hypertrophy of the breast is more or less common, but it seldom calls for operative interference; and as there is always some danger from an extensive operation, I would think one should not operate unless it is absolutely necessary.

THE TECHNIQUE OF PELVIC OPERATIONS BY VAGINAL SECTION.

By J. Riddle Goffe, Ph.M., M.D.,
New York City.

I do not know how popular or unpopular the vaginal route of attack in pelvic diseases of women may be in the Southern Surgical and Gynecological Society, how much it may have entered into your deliberations, or whether there be in your ranks so much as one devotee and advocate of the method. However that may be, I am glad to bring you tidings of its continued satisfactory results in my own hands and of its steady growth in popularity and adoption throughout the country. Scarcely a week passes that does not bring me a letter or a verbal report from some former student who has been using the method with marked improvement in his results over his former experience with laparotomy. The most marked examples of this are at St. Joseph's Hospital in Yonkers, N. Y., in which the entire visiting staff of surgeons—six in all—have as a routine method adopted the vaginal route for pelvic disease to the almost complete exclusion of laparotomy, and with such improvement in their statistics that they are all ardent advocates of the method. These men are, or were, all general surgeons without any special training in gynecology. St. Joseph's is a general hospital with an ambulance service whose range of cases is very wide. But with them every disease confined to the true pelvis in women is attacked through the vagina. A complete report of three years of this work at this institution was recently

presented before the New York Academy of Medicine by Dr. Henry Moffat and since published.[1]

In summing up the results of his experience the author says:

"The following conclusions are fairly indicated not only from my own personal experience, but from what I believe a candid study of the table of cases would teach:

"1. The anterior vaginal route is most useful for reaching and operating upon the round ligaments in cases of retroversion of the uterus or procidentia; also for removal of small fibroids, either subperitoneal or pediculated, for conservative work on the ovaries and tubes, or for removal of these organs.

"2. The posterior incision is most useful for drainage in cases of pyosalpinx, salpingitis, pelvic abscess, some cases of tubal pregnancy with hæmatocele, and puerperal sepsis either with or without involvement of the tubes; for oöphorosalpingectomy, when the ovary is held backward and downward by old adhesions, and even in some cases of acute general septic peritonitis.

"The more I see of this work the more am I impressed with the important truth that no pus tube should be attacked by any other route than by the vagina.

"The following are the summaries of the tabulated record of vaginal operations performed in St. Joseph's Hospital by seven different operators during these three years.

"*Anterior Sections.* Shortening the round ligaments for retroversion, 11; exploratory with breaking up of adhesions, 2; myomectomy, 2; resection of ovary, 1; single oöphorectomy, 3; double oöphorectomy, 2; total, 21 operations, with no deaths.

"*Posterior Sections.* Single oöphorosalpingectomy, 21; double oöphorosalpingectomy, 8; drainage for (*a*) pelvic abscess, 10; (*b*) puerperal sepsis, 6; (*c*) pelvic hæmatocele, 5; (*d*) salpingitis, 2; exploratory operations, 2; total, 54 operations, with 2 deaths, giving a mortality of 3.75 per cent.

[1] New York Medical Record, December 5, 1903.

"*Hysterectomies.* Performed for complete procidentia uteri, 7; puerperal sepsis, 3; double pyosalpinx, 3; uterine fibroma, 2; double pyosalpinx and uterine fibroma, 1; carcinoma uteri, 3; total, 19 cases, with 6 deaths, giving a mortality of 31.6 per cent. The deaths were: in cases of puerperal sepsis, 2; uterine fibroma, 2; carcinoma uteri, 1, double pyosalpinx, 1."

In my own hands the scope of the operation—*i. e.*, the conditions to which it is applicable—is steadily widening. It is no longer confined, on the one hand, to simple puncture and drainage, nor limited on the other hand to the radical operation of hysterectomy. All the intermediate procedures that are called for by the multifarious pathological conditions found in a woman's pelvis find their most direct route through the vagina.

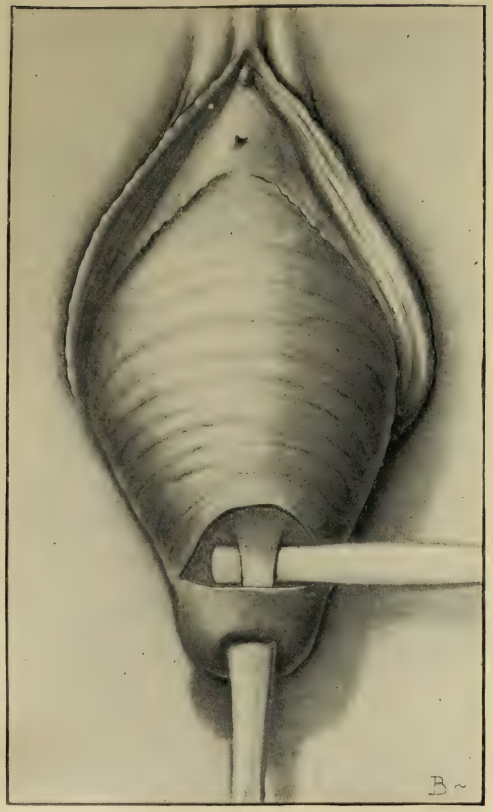
There are two vaginal incisions through which the pelvic cavity can be reached: one posterior to the cervix into Douglas' pouch, and the other anterior to the cervix, separating the bladder from the uterus and opening up to view and touch the entire contents of the pelvis. The latter is the one which affords the greater facilities for operative procedures, and the one which I depend upon almost exclusively. The posterior incision is frequently used in connection with it to afford additional opportunity for the purpose of simply securing drainage, and, in some cases, for manipulation (Fig. 1). Briefly, the procedure consists in making a transverse incision in front of the cervix corresponding to that employed in complete vaginal hysterectomy. Through this incision the bladder is dissected from the uterus up to the peritoneal fold. The peritoneum may then be incised and the peritoneal cavity opened, or that can be left until the next step in the process is completed, which consists in making a longitudinal incision through the vaginal mucous membrane and sheath throughout its entire length. This is accomplished by grasping the edge of this transverse incision either side of its middle point by two artery clamps. Tension upon these clamps puts the anterior vaginal wall upon the stretch, and

an incision is made with the knife from the neck of the bladder down to the centre of the transverse incision. The bladder is then dissected off the vagina for the distance of an inch or an inch and a half either side of this longitudinal incision. The purpose of this second incision and the separation of the bladder is to secure sufficient room in which to work. The dissection is done almost exclusively with the handle of the scalpel and the finger, and the hemorrhage is inconsiderable. Through this opening, whether in virgin or multipara, ample space is afforded for whatever radical or conservative work upon the uterus and its appendages may be indicated. This becomes at once apparent, when we consider that the vaginal cleft—*i. e.*, the introitus vaginæ—is quite as large as the usual abdominal incision of a laparotomy, and by this T-incision in front of the uterus the opening into the peritoneal cavity duplicates the size of the introitus.

The simplest and at the same time very important function which is subserved by an incision into any of the large cavities of the body is that of an exploratory operation. An exploratory incision, so far as possible, should be free from danger; should give facilities for gaining the desired information, and at the same time afford opportunity for the completion of such surgical procedures as may be indicated.

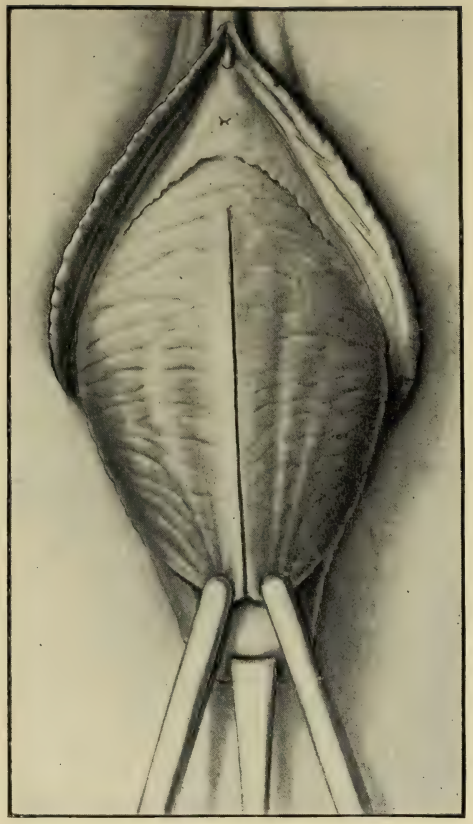
The anterior vaginal incision fulfils these functions most satisfactorily. 1. It is free from danger; more than that, it is devoid of any untoward or annoying consequences. When I first began its use I felt that it might be followed by more or less serious bladder symptoms. In this, however, I have been happily disappointed. Indeed, I have yet to meet the first case in which there has been any symptoms following this procedure referable to the urinary apparatus. The tissues through which the opening is made seem to be unusually tolerant of traumatic interference, and the generous blood supply of these parts favor prompt and complete healing. 2. As an exploratory incision I have found it to afford the means of accurate, definite, and reliable information in regard to the entire contents of the pelvis. 3. The third con-

FIG. 1.



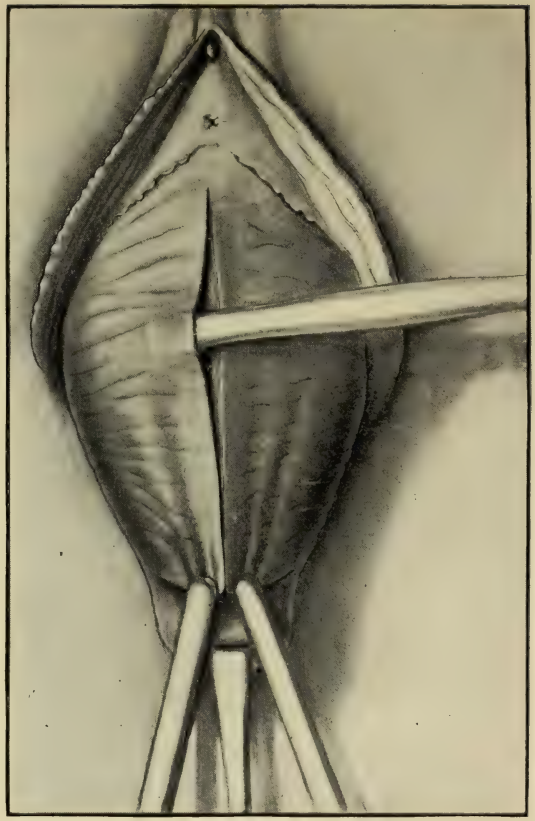
Dissecting out the uterovesical ligament before cutting it.

FIG. 2.



Second incision in anterior section.

FIG. 2A.



Beginning dissection of bladder from vagina.

dition is an important one, and experience is constantly widening the field of its application, and demonstrating that it affords ample space for completing almost every surgical procedure that may be indicated.

Pelvic Abscess. The simplest application of the vaginal method, and the one that probably commends itself most universally to the profession, is incision and drainage of pelvic abscesses. Accumulations of pus in the pelvis may have various locations, depending upon whether they arise from puerperal conditions or the results of infection under the general conditions of life. But whether the pus be in the cellular tissue, in the Fallopian tubes, in the ovaries, or in peritoneal spaces between coils of intestine and adjacent tissues, the conservative and at the same time the efficient method of attack is vaginal incision and drainage. Under these conditions the anterior incision is rarely used, the opening being made posterior to the cervix or in the lateral sulci of the vagina. The predominant indication for this procedure is in cases of large pelvic abscesses, especially if the patients are acutely ill or prostrated from long-continued suppuration. Noble, of Philadelphia, says that in this class of cases this procedure gives in his hands a mortality of 2 per cent., as contrasted with one of 25 per cent. or more by abdominal section. There is no question concerning the positive merits of the drainage operation; it is done quickly, does not cause shock to the already weakened patient, and permits her to recover from the critical condition in which she is placed by the accumulation of pus and the general septic condition. Should the ovaries and tubes of both sides be found involved and collections of pus therein, they may be freely opened through the posterior incision and drained. The central incision is made into Douglas' pouch, and into that common cavity the various pus pockets are opened. Should the condition of the appendages be such as to necessitate their removal and the vitality of the patient warrant it, they may be removed through the posterior incision or a panhysterectomy performed, thus accomplishing what our lapa-

rotomy friends call "a completed operation." In cases in which the appendages of one side show probability of recovery, it is my custom to pack the pelvis through the posterior incision with gauze for the purpose of lifting the intestines out of the pelvis, and to then make the anterior incision, remove the hopeless appendages, washing, cleaning up and disinfecting the appendages to be left. As a rule, it is safest in desperate cases to simply open into the collections of pus, break up the involved cellular tissue and insert a T-drainage tube.

Vaginal incision and drainage have, by universal approval, taken the place of vaginal puncture. One point in the technique I wish to emphasize, and that is that the incision through the vaginal tissue should be sufficiently free in its extent to afford opportunity for careful investigation with the finger and ensure a sufficiently patulous opening during the succeeding drainage period. The uterosacral ligaments are such important structures in retaining the uterus in its normal position that I am careful not to interfere with their continuity, and after entrance through the peritoneum into Douglas' pouch prefer to dilate and stretch rather than to cut. The technique is as follows: The cervix is seized with a strong traction forceps and drawn down to the vulva or as near to it as possible with reasonable traction. A transverse incision is made with scissors or knife in the middle line through the posterior vaginal wall close to the cervix down to the peritoneum. The latter is then caught up with a mouse-tooth forceps and snipped with the scissors. Through this opening first one index finger is pushed and then the other, and the peritoneum torn and stretched out to the uterosacral ligaments, care being taken not to injure these structures. In case of hemorrhage the cavity should be packed with gauze and the insertion of the drainage tube postponed until the gauze is removed.

Shortening the Round Ligaments. The condition in which I first applied the anterior incision was that of retroposition of the uterus, and perhaps it may be well to speak

of that first. I am a firm believer in the principle that the uterus is supported exclusively by its ligaments: that when a uterus remains in normal position it is because its ligaments retain it there, and when a uterus gets out of its normal position it is because the ligaments have failed to do their duty. This is indisputably the case in unmarried women who suffer from procidentia or simple retrodisplacement. In cases, therefore, of displacement of the uterus, the ligaments and the ligaments alone are the proper tissue to utilize in restoring and maintaining the uterus in its normal position. The success attained by the Alexander operation of shortening the round ligaments at the external ring, and by the Wylie-Mann operation of shortening the round ligaments intraperitoneally, and the multiplicity of devices for utilizing the round ligaments for this purpose is ample assurance of the efficiency of these ligaments for this purpose. In this connection, we recall the Kellogg, Dudley, Goldspohn, Gilliam, and many other operations. My plan of procedure consists simply in shortening the round ligaments inside of the pelvis; but I do it through the anterior vaginal incision.

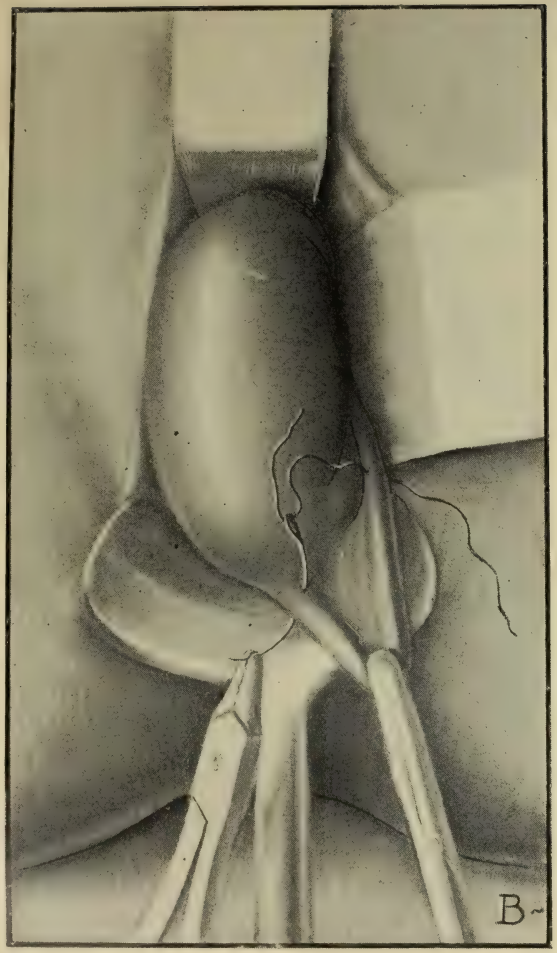
The technique is as follows: After entering the peritoneal cavity, the uterus is dragged down firmly by traction forceps attached to the cervix, and the finger passed over the fundus and slipped along until it hooks over the broad ligament near the uterus. The round ligament near to its origin from the uterus is then seized between the index finger, which is on the posterior face of the broad ligament, and the thumb, which is anterior. The cervix is now pushed into the posterior fornix and the traction forceps removed, the cornu of the uterus in the mean time being dragged forward and downward into the vagina. The bladder and vagina are pushed up by a retractor or the index finger of the other hand, and by a little persistent effort the entire uterus is delivered into the vagina. In accomplishing this manœuvre, I never catch the fundus with a volsellum forceps, tenaculum, or other pointed instrument. They break the peritoneum and give a point for future adhesions; sometimes cause annoying hemor-

rhage. As a rule, the fingers are the only instruments necessary. If a little firmer grip is desirable, the ovarian ligament near to the fundus may be grasped by a sponge forceps. This ligament is strong and fibrous and affords a very good hold. The round ligament, first of one side then of the other, is caught by an artery clamp from one to two and a half inches from the horn of the uterus and dragged down in the form of the letter U. A fine, twisted silk suture is now passed through the ligament at a point on the outer side of the forceps and then near to the uterus (Fig. 3). The point selected at the outer side of the forceps is at as remote a point as will allow of approximation to the second point, through which the stitch is passed near the horn of the uterus. It is then tied, thus shortening the round ligament to an extent equal to the length of tissue taken up in the loop. The two arms of the loop between this suture and the forceps are then stitched together by two sutures of silk, and, finally, a third one catches the tip of the loop and attaches it to the anterior face of the uterus just at the origin of the round ligament. This latter suture is simply for the purpose of disposing of the loop of tissue, although it doubtless affords an additional support. The horn of the uterus thus treated is allowed to resume its position in the pelvis. The other horn of the uterus is drawn down and the round ligament of that side treated as in the first instance. The uterus is then allowed to take its normal posture of anteversion in the peritoneal cavity, and the bladder tissue is adjusted to its original position. Two catgut sutures sew up the transverse incision in front of the cervix, and interrupted catgut sutures restore the vagina along the longitudinal incision. The vagina is then packed with gauze and the operation is completed (Fig. 4).

Cases of retroversion complicated by adhesions, either of the uterus or of the appendages, are made to conform to this technique after the adhesions have been broken up by the finger.

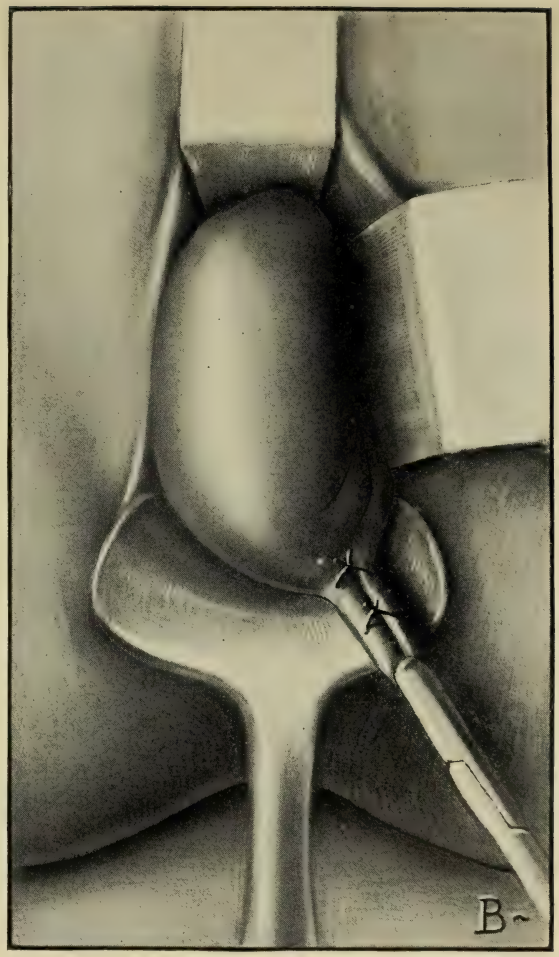
Where the adhesions extend to the bottom of Douglas' pouch and are difficult of access, a posterior vaginal incision

Fig. 3.



Shortening the round ligaments, first suture.

Fig. 4.



Shortening the round ligaments, first and second sutures tied.

is made, and through this the separation of the adhesions is completed.

Resection of Tubes and Ovaries. It is my custom always in these cases, after delivering the uterus into the vagina, to bring down the appendages also, first one side and then the other, and do such conservative work upon them as their condition indicates. This work consists of such procedures as puncturing multiple cysts of the ovaries with a Paquelin cautery, in some cases resecting portions of the ovaries, at the same time freeing the Fallopian tubes from adhesions, opening up the fimbriated ends, and, under a stream of normal saline solution, massaging the tubes, squeezing out any retained secretions, probing the tubes to discover their patency or constriction, disinfecting them with pure carbolic or tincture of iodine on a probe, and, when necessary, amputating them at a point that will afford a patulous tube from there on to the uterus.

My work in this department of conservation of tissue and function of the ovaries and tubes in connection with shortening the round ligaments has been most satisfactory. In cases of pyosalpinx where the tube is hopelessly destroyed, the greatest facility is afforded for dissecting out the tube from the horn of the uterus and closing its bed with sutures. The fundus lies in the introitus vaginæ, where the tube and ovary are easy of access and one or both can be taken off by the angiotribe or by ligature. If the tube is dissected out of the horn of the uterus its bed is closed by sutures. My cases illustrate all forms of complications, from the simple removing of diseased appendages through the whole range of conservative procedures to the removal of the products of conception in ectopic pregnancy, dermoid cysts, myomectomy for small fibroids, and hysterectomy by morcellation for large fibromyomatous tumors.

It is a nice question to determine how far active surgical interference is advisable in cases of acute infection of the uterine appendages. Polk, Pryor, and Henrotin have advocated and practised opening of the cul-de-sac and drainage in

cases of threatened or early involvement of the appendages as a prophylactic or function-saving procedure. During the past month I have gone a step farther, and in two cases of acute salpingitis with constitutional symptoms, one of which had reached the stage of pus formation, a tubo-ovarian abscess, I have boldly attacked the disease through both the posterior and anterior incisions.

Case I.—Mrs. S., the mother of two girls, who six weeks after her second confinement was infected with gonorrhœa. Six weeks later she entered one of the large New York hospitals, where she was told that the only thing that would cure her was the removal of her uterus and appendages—a panhysterectomy. To this she would not consent, because, as she said, she wanted a boy baby. She therefore left and through an acquaintance with some of my hospital clientèle came to me at the Polyclinic. She had a temperature of 101° F., a foul tongue, irritable stomach, a mass as large as one's fist involving the left appendages, and a large adherent tube on the right side, also an effusive leucorrhœa. I told her I thought it very probable that I could save the right ovary and tube if the operation were done promptly, and if I were successful it would be possible to secure her longed-for boy. She consented. The uterus was thoroughly curetted, swabbed with pure carbolic acid, and packed with iodoform gauze. The cul-de-sac was opened, adhesions gently severed with the finger, and some iodoform gauze carried up to the promontory of the sacrum. Then the anterior incision was made, the balance of adhesions surrounding the inflammatory mass separated, and the fundus of the uterus delivered into the vagina. The appendages which were the less involved were then drawn down, the tube found enlarged, inflamed, occluded, the fimbriæ being adherent to the ovary. Under an irrigation of hot saline the ovary was washed; the fimbriæ were massaged and opened out; the contents of the tube, consisting of a few drops of mucopus, were milked out, and a silver probe loaded with tincture of iodine carried into the tube its full length. The fimbriæ and ovary were also brushed

lightly with iodine. These were replaced and adjusted upon the gauze which had been inserted in the cul-de-sac. The involved mass of appendages of the left side were then brought down to the vulva and a collection of pus involving the ovary and tube was set free and the appendages removed with the angiotribe. The uterine stump of the tube was dissected out and the horn of the uterus stitched. The uterus was then restored to its normal position, the peritoneum and bladder adjusted, the longitudinal vaginal incision stitched, the transverse incision being left open and the vagina packed with gauze. On being placed in bed she was immediately adjusted to the Fowler position and kept there for several days. This position is attained by elevating the head of the bed, thus facilitating drainage of the pelvic and abdominal cavities. The head of the bed is raised two and a half to three feet. To prevent the patient slipping down toward the foot of the bed, a sheet attached at both ends to the head of the bed is passed down around the buttocks like a sling, a pillow being placed between it and the buttocks for comfort. The expression of the faces in the illustration indicates how comfortable they are.

CASE II.—Miss L., a young hairdresser, who was sent into the hospital by her physician to be curetted for leucorrhœa and menorrhagia. She had had a miscarriage a year before. Upon examination under ether it was discovered that she had a retroverted, adherent uterus, and double salpingitis. As nothing had been said to her about opening the peritoneal cavity, only curettage was done. Following this she developed temperature and sensitiveness over both ovarian regions, and ten days later she was subjected to vaginal section. Old adhesions were firm and extensive over the posterior face of the uterus, reaching to the top of the fundus; both tubes were occluded and adherent to the ovaries, with collections of mucopus and seropus at the infundibula of the left and right sides, respectively. The adhesions were broken up, the uterus and appendages, first of one side and then the other, delivered into the vagina. The fimbriæ of the left side were separated

from their grip on the ovary, massaged and opened out. On the right the fimbriæ were obliterated hopelessly and the tube sacculated. The adhesions to the ovary were separated, the sac incised and evacuated. Both ovaries were washed with saline solution and bichloride, the tubes irrigated with the same, using sufficient pressure to dilate them throughout their entire length, and disinfected with iodine on silver probe. Gauze was packed in cul-de-sac, draining through the posterior fornix. The round ligaments were shortened and anterior incisions closed. Gauze was also packed in the vagina. Patient placed in bed in Fowler position. Both patients are making a smooth and satisfactory convalescence. One is in her third week of convalescence and the other in the fourth.

Anterior colpotomy is used by different operators for accomplishing the relief of displacements in various ways. Dührssen and Wertheim shorten the round ligaments sometimes by doubling them upon themselves, as I have described, and sometimes by fastening a loop of the round ligament to the vaginal incision. The latter method is advocated by Vineberg, of New York. In certain instances the uterus is attached to the vaginal wall by the method known as vaginal fixation. The dangers of this method, I think, have been greatly exaggerated, and the unfortunate consequences that have followed in the cases reported have undoubtedly been due to an unnecessary and unwarranted extreme anteversion of the uterus. Judgment must be used in determining the point upon the anterior uterine wall at which the vagina should be attached. I frequently put a sustaining suture through the anterior uterine wall, attaching it to the vagina, in cases in which I find undeveloped round ligaments or in which the inflammatory deposit at the base of the broad ligaments tends to hold the cervix forward in the pelvis, thus making undue tension upon the round ligaments.

Uterosacral Ligaments. In this connection, I might refer to the comparatively new procedure of shortening the uterosacral ligaments for the relief of retroversion. Your

FIG. 5.

The Fowler position for pelvic drainage.

honored President, Dr. Bovée, has resorted to this in a greater number of cases perhaps than any other operator, sometimes reaching the ligaments through an abdominal incision and sometimes through a posterior vaginal section. I have used it in connection with shortening of the round ligaments in a number of cases, and found it a feasible procedure in cases of procidentia and those in which the vagina is relaxed and the cervix low in the pelvis. I reach the ligaments through the posterior vaginal incision and shorten them by doubling them on themselves as I do the round ligaments. My conviction is that the uterosacral ligaments are a most important factor in retaining the uterus in its normal position. They are, indeed, the all-important factor. Whether they are shortened and made to perform their normal functional support by direct operation upon them, or whether the indirect result of some other operation enables them to involute and recover their tone and sustaining power, certain it is that unless they come to the aid of the other ligaments and hold the cervix high in the hollow of the sacrum, sooner or later the condition of the displacement will be reproduced. I regard the uterosacral ligaments as the most rational structures to utilize for the cure of retrodisplaced uteri, but find it difficult to apply, except in selected cases.

Speaking from my own experience, although, like most of us, I have had more or less experience with all the operations that have been suggested for the relief of displacements, I have not found one that has given me such universal satisfaction as shortening of the round ligaments through the vaginal incision. So far as my knowledge goes, I know of but three failures in a series of over 200 cases, and these were due to some departure from the regular procedure in which a modification was attempted. Among the 200 cases, 8 private and 4 charity patients are known to have become pregnant, and 10 have gone to full term, pregnancy proceeding most comfortably and satisfactorily, and the uterus retaining its proper position thereafter. Doubtless many others have borne children since the operations, but of them

I have no knowledge. Of the miscarriages, one was in a syphilitic negress, and in the other the cause could not be learned.

In my experience the most frequent causes of retrodisplacement of the uterus is suppurative disease of the appendages, involving from 75 per cent. to 80 per cent. of all cases coming under my observation requiring surgical interference for this affection. Because of these complications the Alexander operation, pure and simple, is applicable to an extremely limited number of cases; it becomes necessary therefore in order to treat the remaining cases satisfactorily and effectively to open into the peritoneal cavity, and the question is: Shall it be done through the abdomen or shall it be done per vaginam? The advantages of the vaginal operation are that the healing process goes on unconsciously to the patient, without any more constitutional or local disturbances than that which attends a simple trachelorrhaphy. The patient is not mindful of having had an incision made, nor does she bear upon her person any trace of a surgical operation. There are no adhesive plasters to be applied, no stitches to be removed, no bandage or supporter to be worn; there is no ugly scar, and there is no danger of a future hernia.

This procedure has its most appropriate application in cases of congenital or acquired retrodisplacement in unmarried women. Among my cases I have 9 of congenital retroversion or flexion in unmarried women, whose ages range from nineteen to twenty-seven years. In these cases, although the vagina was small and the hymen intact in all of them, I was able to perform this operation, and effected a cure. In most of these cases I found it necessary to incise the vagina on one or both sides at the seat of the hymen, extending the incision one or two inches into the canal.

The condition in cases of congenital displacement is rather peculiar. In them the uterovesical ligament is shortened, the uterosacral ligaments are lengthened, and the cervix is drawn forward into the axis of the vagina. The anterior vaginal wall, too, is attached low down on the anterior lip

of the cervix, thus drawing down the short arm of the lever (the cervix) and throwing the long arm or fundus back into the hollow of the sacrum. The operation through the anterior fornix necessarily severs the uterovesical ligament at its attachment to the cervix and sets the latter free, so that it swings back into the hollow of the sacrum and allows the fundus to come to the front. In these cases in closing the vaginal incision, after the round ligaments have been shortened, the attachment of the anterior vaginal wall is carried up on the anterior face of the uterus. This brings the pull of the uterovesical ligaments on the long arm of the lever or the fundus.

Congenital cases of retrodisplacement are notoriously difficult to cure, but with these combined procedures my results have been uniformly successful, all the cases now being under observation for periods ranging from five to two years. These women bear no mark upon their persons of having been submitted to an operation, except that the hymen has been destroyed.

Myomectomy. The trend of gynecological work in all its departments for the past ten years has been strongly toward conservatism, seeking not only to preserve anatomical structures, but also to conserve physiological function. This has nowhere been more conspicuous than in the application of myomectomy in preference to hysterectomy in the treatment of fibroid tumors of the uterus, and the further it is extended the more numerous become the cases in which it is apparent that myomectomy can be applied and the uterus preserved. It has been demonstrated that when tumors are small they can be reached through the vagina, and the advantages of this route of attack secured in their removal. The bed of the tumor requires careful and delicate treatment to avoid hemorrhage, and, in my experience, the anterior vaginal incision, in selected cases, offers these advantages to a most satisfactory degree. In many instances I have removed fibroid tumors in this way. If the tumor or tumors are in the anterior wall they are brought into view as the bladder is

dissected from the uterus, and removed in succession, the bed of the tumor being closed with a buried catgut suture. If they are at the fundus they are brought into view and reach by lifting the bladder strongly on a retractor, the fundus being gradually brought down into the vagina as the tumors are removed, and the peritoneum closed over their site by Lembert suture. And so the uterus is rotated into the vagina as the work proceeds until the posterior aspect of the uterus is in view and tumors removed, even as low down in the posterior wall as the cervix.

Uterine polypi are, as a rule, removed per vias naturales, but even in cases in which the tumor is large and requires morcellation for its removal, the work can be greatly facilitated by performing the anterior vaginal section, thus carrying the bladder high in the pelvis and making room for manipulation. There is no objection under these circumstances to splitting up the anterior uterine wall as far as may be necessary to reach the seat of the growth. After removal the uterus contracts down and can be easily restored to its normal condition. It has been found that the danger of infection from the interior of the uterus, which was formerly thought to be very great in these cases, is of no serious importance, except in cases of sloughing polypi. As an illustration of the innocuousness of the interior of the uterus, I might cite the following case: In a myomectomy recently in which a large tumor was removed from the fundus uteri by abdominal section, I broke through into the uterine cavity, and, finding the mucous membrane extensively degenerated, I curetted the uterus through the opening in the fundus, swabbed it out well, and then carried some gauze down through the cervix into the vagina. There was no infection following the procedure, the patient making one of the most afebrile convalescences that I have ever seen. Dr. McCosh made cultures of scrapings from the uterine cavity in a number of cases in which the uterine cavity was entered in myomectomy, but in only one instance did he get any culture, and even that was thought to be an accidental contamination.

Martin, of Germany, is strongly in favor of the vaginal route in dealing with fibroids of the uterus. He insists that the size of the tumor is not in itself a contraindication, since growths of large size can readily be removed per vaginam by morcellation. On the other hand, in the presence of firm suprapelvic adhesions, especially intestinal, the abdominal route is preferable; but deep pelvic adhesions and intraligamentary tumors are best handled from below. Martin fears injuries to the bladder and uterus more than he does hemorrhage, especially the former. He has never injured the ureters during vaginal myomectomy, though this accident has frequently occurred in his abdominal operations. When it is possible he enucleates tumors without removing the uterus. In young women he aims to leave one ovary. During three years he has performed 87 vaginal and 31 abdominal myomectomies. The latter were all complicated, and 6 terminated fatally. Of the vaginal operations, 35 were total hysterectomies, with no deaths, and 52 were enucleations, with 2 deaths.

The possibility of dealing with small tumors per vaginam seems to me to change radically the viewpoint in cases of fibroid tumor. Between the waiting policy of those who take the position that an unmarried woman suffering from a fibroid tumor, however insignificant, should not be permitted to marry, but that nothing should be done looking to its removal, unless after months or years of waiting and watching the tumor shows signs of growth—between this position, say, and the attitude of those of the radical wing of the profession who insist that in all cases of fibroid tumor of the uterus nothing suffices but prompt and sweeping hysterectomy, we have now a middle ground, which seems to me a golden mean, in which we can say to a woman suffering from a fibroid tumor, "Have it removed at once." This will not only relieve her present and anticipated troubles, but it will also set her mind at rest. If the tumor or tumors be small, they can be removed per vaginam with the least possible traumatism, danger, or discomfort. If the tumors are

too large to permit of this procedure, they are amenable to myomectomy by the abdominal incision, radical work of hysterectomy being confined to an extremely limited number of cases, and those usually in women at or beyond the menopause.

Sterility. At the recent meeting of the American Medical Association at Saratoga, I presented a paper on vaginal section for the relief of sterility, and christened my paper, "Is it Justifiable to Enter the Peritoneal Cavity under These Circumstances?" In this paper I took the position that in cases in which the husband has been eliminated as the cause of sterility, the causal factor can be located either in the easily approached condition of anteflexion and endometritis or in some occluding pathological condition that prevents the progress of the ovum from the ovary to the uterus. In many instances the latter condition is caused by the most trivial mechanical interference, such as cobweb adhesions surrounding the ovary, or restraining the fimbriæ and binding the tubes in tortuous and constricted positions. These conditions are, in many instances, the result of remote infection from a chronic endometritis, and are frequently impalpable by abdominal manipulation. While I have never felt justified in subjecting a woman to laparotomy in cases complaining simply of sterility, I now deem it entirely proper in cases of sterility, after dilating the cervix and curetting the uterus, to open into the pelvis through the anterior vaginal fornix as an exploratory procedure, dealing with the appendages according to the conditions found. I am doing a good deal of such work and with most satisfactory results, three more patients having reported to me this autumn as being enceinte. Of course, this work can be done through the abdominal incision, but, from the standpoint of the patient, the simplicity of the operation per vaginam and its freedom from danger indicate that the vaginal route is the more desirable for the treatment of these conditions.

Ectopic Pregnancy. Much criticism is always heaped upon the man who dares to propose the vaginal operation

for the relief of ectopic pregnancy. And yet, after considerable experience with this method in ruptured and unruptured tubal pregnancy, it seems to me the most rational and direct route of attack. The difficulties of the situation, as a rule, are not to be compared with those incident to an acute or chronic tubo-ovarian abscess. In the majority of instances there are no adhesions to deal with and there is no infection or pus focus. If the tube is not ruptured, its removal per vaginam is about the simplest proposition the gynecologist is called upon to deal with. If the tube is ruptured and active hemorrhage is in progress, the main channel supplying the blood, the ovarian artery, is easily reached and controlled, after which the products of conception and the blood clots are removed at leisure. In the great majority of cases active hemorrhage has ceased at the time of operation, and all that the surgeon finds necessary to do is to remove the blood clots, and that not very thoroughly, and the products of conception. This can all be done with as great thoroughness through the vagina as through the abdomen, and with as extreme consideration for the appendages of the opposite side.

The latest refinement of a conservative character in dealing with tubal pregnancy consists in shelling out the contents of the oviduct and leaving the tube *in situ*. The rent may or may not be closed. This is being done in Europe and in this country, and by both the abdominal and the vaginal methods. It would seem to need no argument to commend it to all operators. In cases of active hemorrhage the ovarian artery can undoubtedly be reached with greater despatch by the abdominal incision than by the vagina. Moreover, the vaginal method necessitates the lifting of the patient to a table, whereas in desperate cases the abdominal operation can be done in bed, and further loss of blood instantly prevented. But in the less urgent cases the vaginal operation is preferable.

Vaginal Cæsarean Section. The latest applications of the vaginal method are vaginal Cæsarean section and the reduction of inversio uteri. The most recent contribution

on the subject of vaginal Cæsarean section is the paper of Dr. Stamm, presented at the recent meeting of the American Association of Obstetricians and Gynecologists, in which he reported 2 successful cases of his own and commented upon 60 cases reported by other operators. The majority of these were undertaken for cancer of the uterus, but the number performed for puerperal convulsions is increasing rapidly, and this condition will furnish the chief indication for such an operation in the future. He stated that to Dührssen, of Berlin, the credit is due for having introduced this valuable method into practice. The indications for the operation, as given by Dührssen, are: "1. Abnormal conditions of the cervix and lower segment of the uterus (carcinoma, myoma, rigidity, stenosis, partial pouch-like distention of the lower uterine portion). 2. Dangerous conditions of the mother, which may be removed or relieved by prompt emptying of the uterus; affections of the heart, lungs, and kidneys. 3. Condition of the mother where death is imminent and can be foreseen." The last two indications have value only in cases in which the cervix is closed and not dilatable, or where the depressing influence of labor pains should be obviated, as in affections of the heart and lungs. In pregnancy complicated with cancer of the uterus Dührssen advocates immediate vaginal section, with subsequent extirpation of the uterus, no matter at what time of pregnancy or at what stage of labor this condition is encountered.

Inversio Uteri. In the vaginal operation for inversion of the uterus we have a procedure that for safety, simplicity, and efficiency surpasses all methods that have been suggested. The operation is so rational that the wonder is that it was not the very first procedure to be proposed for the relief of this condition rather than the last. The technique is probably familiar to all: The cervix is seized with traction forceps and dragged down into view, the operator electing whether he will incise the constricting band anteriorly or posteriorly. If the latter, that lip of the cervix is drawn down allowing the fundus to rotate up behind the symphysis and an incision

made with scissors or knife in the median line extending through the constriction. If the anterior incision is the one of choice, that lip is drawn down and similarly incised. The latter method offers the advantage of being more convenient both for the incision and the final suturing. Each, however, has been used with eminent satisfaction to the operators.

Dr. Reuben Peterson, of Ann Arbor, read a paper on this subject at a recent meeting of the Chicago Gynecological Society, and reported a case. The patient was an American, aged twenty-six years, and married three years. Her family and personal histories were negative. Her menstruation first appeared at the age of twelve, and up to the time of her present trouble was entirely normal. Her first confinement occurred about fifteen months before her entrance to the hospital. It was an easy labor, and was terminated by forceps, the instruments being applied only about five minutes. The patient did not remember about the delivery of the placenta and felt nothing give way. She flowed very profusely and was given ergot, presumably. She stopped flowing soon after the completion of labor, and there was no further hemorrhage until the seventeenth day, at which time she had been up and about the room for a week. Two weeks later she consulted her physician, who told her there was something wrong with the uterus. He made a number of unsuccessful attempts "to fix it." Dr. Peterson saw the patient soon after this. Vaginal examination disclosed a typical inverted uterus, with rather a small fundus, situated about one and a half inches within the introitus. High up in the vagina could be felt the cervical lips, forming a complete collar or rim at the extremity of the uterus. The inverted uterus was grasped with the volsella and pulled forcibly outward and downward. Another volsella caught the anterior vaginal mucosa in the median line just above the anterior lip of the cup and pulled it sharply upward. Through the vaginal mucosa thus made tense a horizontal incision was made some two and a half inches in length. To avoid opening the bladder the incision was made as close to the cervix as possible. The vesico-

uterine peritoneum was opened and the cervix exposed. A volsella was placed on the anterior lip to either side of the median line, and the cervix incised between. This incision was carried upward in the anterior median line of the uterus to within one-third inch of the fundus. The inversion was now easily reduced, the fundus going upward, and each half of the divided cervix being carried through half the arc of a circle and finally meeting, so that the two halves formed a complete cervix situated downward, not upward. He now adopted the suggestion of Taylor, and removed a wedge-shaped piece of the bulging uterine wall on either side of the incision. This was done to enable the retracted edges to come together. The uterine incision was next closed by a continuous catgut suture. The needle was passed from the peritoneal surface down to, but not through, the uterine mucosa. There was some gaping in one or two places, in spite of the utmost care to bring together the peritoneal edges. An unsuccessful attempt was made to close in the spaces by interrupted sutures, but the stitches tore through the uterine wall when much tension was placed upon them. A catgut suture was passed around each round ligament close to the uterus, and each end passed through the anterior vaginal wall and tied, after the fundus was returned within the pelvic cavity. This brought the defectively sutured line of incision up against the bladder peritoneum, at the same time giving support to a fundus which had been prolapsed for months.

Hysterectomy. Vaginal hysterectomy is indicated, in cases of inversion, only in the presence of intractable hemorrhage, infection, or when the irreducible fundus has been so injured that there is no probability of its regaining its functional integrity. The technique of vaginal hysterectomy I will omit.

A few words in reference to the preparation of the patient for vaginal operation and the after-treatment, and I am done. To prevent unpleasant experiences from movements of the bowels during operation, no rectal injections, high or low, are allowed within twenty-four hours of the operation. For

clearing the intestinal tract three compound cathartic pills (U. S. P.) are given the day preceding the operation. The instructions to the nurse are: Three compound cathartic pills about 2 P.M. (not later). If the bowels move the third time give ½ drachm tinct. opii camph., and repeat every time the bowels move thereafter. The pills will, as a rule, produce two or three thorough evacuations before bedtime. In rare instances the catharsis will be excessive unless checked, and for that reason the order is given to check them with paregoric. If no paregoric is required, trional (gr. xv) is administered at bedtime to tranquillize the nerves and produce sleep. If paregoric has been required the trional is not indicated. In no instance where these instructions have been carried out in all details (especially the hour of administration) has any leakage from the bowels given annoyance during the operation.

The vagina is sterilized by vaginal douches of bichloride solution, 1:3000, given twice each day for several days preceding the operation. The day before, the vagina is packed to the degree of slight distention with iodoform gauze 10 per cent. immersed in and wrung out in hot solution of bichloride, 1:5000. This is removed by the operator immediately before beginning the operation. The vagina is then douched or swabbed with normal saline solution.

In dressing the case after operation iodoform gauze is used freely. This gauze is 10 per cent. iodoform that has been soaking for weeks in sol. bichlorid., 1:500 (one to five hundred). Upon beginning the operation as much of this as is considered necessary is put to soak in sterile hot water and there it remains until required, when it is wrung out as dry as possible and used for drainage or packing, or both, as indicated. The excess of iodoform and of the bichloride is washed out by this process and a safe gauze that is not only aseptic but antiseptic is the result. In all cases of hysterectomy of the vaginal incision is left open and gauze packed into the pelvis, carrying the intestines up beyond any possibility of contact with the broad-ligament stumps. If extensive adhesions

between the intestines and the uterus and appendages have been severed or the pelvis has been stripped of peritoneum, the gauze is placed in contact with the denuded surfaces and the pelvis packed full of gauze, carrying the intestines up out of the pelvis. The gauze is packed in one long strip. The presence of this gauze stimulates a profuse outpour of serum, which washes down on to the gauze any debris or sepsis, where it is disinfected and drained away by the gauze.

There is no more perfect drain for the pelvis or peritoneal cavity. This gauze is left undisturbed, if all goes well, until the fourth day, when a beginning of its withdrawal is made. From four to six inches of gauze are drawn out each day, the protruding amount being cut off at the vulva and the proximal end returned to the vagina. In the mean time vaginal douches of boracic acid, saturated solution, are given twice each day. This solution is carried up by the capillary attraction of the gauze, dissolves any adhesions that may have formed, and sets the gauze free. The last of the gauze comes away usually on the seventh or eighth day. The gauze being in one continuous strip, there is no danger of any stray piece being left, and this entire after-treatment is done by the nurse without removing the patient from her bed. As the gauze is being thus gradually drawn out the intestines, the head of the vagina, and the surrounding parts gradually settle down to their normal positions, and when the last of it comes away the head of the vagina collapses and entrance to the pelvic cavity is sealed. The presence of this gauze in the pelvis drains away all infection and renders the surfaces aseptic. The plastic exudate that may be thrown out, unless infected, is reabsorbed and no permanent adhesions remain.

In all cases requiring the most complete drainage obtainable the patients on being put to bed are at once placed in the Fowler position, as shown in the diagram. This favors drainage by gravity and is a life-saving device in cases of acute infection. Two of the patients shown in the illustration are those whose histories have been recited in this article—cases of acute pelvic infection.

I have not gone into the minute details of all these various procedures, nor have I burdened you with long reports of cases, my effort being simply to present, as it were, a bird's-eye view of the possibilities and the technique of pelvic work along the vaginal route.

On general principles, I believe all of us are ready to subscribe to the dictum that, so far as the patient is concerned, any operation that can be as well done through the vagina as through the abdominal incision is better done along the vaginal route. The possibilities of this will undoubtedly vary with individual experience, but the more experience I have, the broader becomes the field of application, until it seems to me that any pathological condition that is confined to the true pelvis can be dealt with as satisfactorily, with as permanent results and with far greater safety to the patient, through the vaginal incision as through the abdominal incision. My cases have embraced every variety of disease, from simple retroversion with or without adhesions to prolapsed and cystic ovaries, unilateral and bilateral salpingitis, ectopic gestation, fibroid tumors of the uterus, and dermoid cysts. The method lends itself to every form of conservative work upon the uterus and its appendages that has been suggested in the trend of recent modern gynecology. The successful application of it requires patience, experience, and skill, but when once the profession has been convinced of its superiority, I believe it will steadily and rapidly grow in favor and become the accepted method for the man who practises the specialty of gynecology.

DISCUSSION.

Dr. Henry T. Byford, of Chicago.—I do not like to let this paper pass without saying a few words on this subject, as it is one in which I have been interested for many years.

With reference to the vaginal section, I commenced doing it ten years before the essayist, and I feel that I have cut my eye-teeth. If I understand the essayist correctly, he is doing this operation more and more all the time, while I find that I am doing it less and less. It is the doing of vaginal section as a

routine method that constitutes the chief objection to the remarks of the essayist. I do not think any man would practise any method as a routine method, nor should any disease be treated by a medical man in a routine manner. There certainly are cases in which we should not employ the vaginal method of operating.

I am inclined to think the essayist was humorous when he spoke of sitting comfortably in the sunlight and doing these operations. I find it often the hardest work I have ever done. I would rather do two abdominal sections than one difficult vaginal section. I at one time tried to do everything by the vaginal method; I tried to be original, but soon had to give it up.

I think an important point has been missed, namely, in telling when we should and when we should not do the vaginal operation. When the cervix is held firmly by a great many adhesions, and you find an exudate by palpation over the pubes, I would advise you not to resort to the vaginal method. If you are after the uterus and everything, you may do it by the vaginal method. But if you do conservative surgery, make an incision above, so that you can see what you are doing, then you will do better work. If the uterus is retroverted and you want to shorten the round ligaments, I believe we should make the anterior incision, because we can get at the ligaments and do all we desire through one incision. But in most cases I would not make the incision behind the cervix. The incision in front is complicated. You must separate the bladder and go through a lot of connective tissue between the uterus, bladder, and vagina. When you finish you have a complicated wound that is difficult to close satisfactorily and completely. I close it up, but I leave a piece of gauze in one corner, so that if there is any error in the technique it will not cause the formation of an abscess. If there is no retroversion in the proper cases I prefer the simpler method of going in behind. I have resected ovaries and separated adhesions in this way, and I think it is fully as easy.

When the adhesions are separated the cervix becomes movable; you can pull the parts into the vagina.

For exploratory purposes, the posterior vaginal incision is preferable. With a small simple incision and with a minimum amount of traumatism, we can explore and determine whether or not we have anything above, pus or no pus.

Those of us who have read the literature know of many fatal cases that have occurred in the practice of those who are performing anterior colpotomy quite extensively. Therefore, the point I want to make is that when you have a pelvis pretty well filled with exudate which is not low down, you had better make your incision above; do a simple and quick operation, and you will save yourself a great deal of sweating, trouble, and anxiety afterward, because of the great difficulty of operating upon cases from below.

Dr. M. C. McGannon, of Nashville.—I think we should congratulate Dr. Goffe on the excellent paper he has given us. It demonstrates very well that a man who devotes his energies in any special direction will do his work probably better in that way than in any other. He is a specialist in this particular direction, operating upon the pelvic organs through the vagina, and I have no doubt he obtains more satisfactory results by the vaginal method than he would by any other. Personally, I have had some experience along this same line, but I find that it affords me less pleasure to work in that way now than it did ten years ago. And just here I want to raise my voice against the term *exploratory incision*. I thought we in America had gotten beyond that. Two years ago, when I was in Europe, I found that there were operators both in London and Edinburgh who were making exploratory incisions. We in America I think have gotten beyond that, as I believe there are very few men who are advising exploratory incisions. I think the less we use that term the better it will be for our work. We should strive to make the diagnosis before the abdominal cavity is opened, and then operate by the vaginal or other method. Incision through the vagina gives a definite space. You cannot enlarge it; you cannot make it any less; three inches is probably the utmost you can gain. If you find, after you have opened the vaginal vault into the peritoneal cavity, that you have a space of three inches through which to work, and that the conditions encountered demand a greater space for working purposes, it is better to make an abdominal incision. Even those who operate through the vagina at the present time make abdominal preparations, so that they can speedily open the abdominal cavity by an incision above the pubic bone if they find it necessary to do so. The incision, then, in operating by the vagina is limited. Many of you will remember the difficulties you experienced in bringing the uterus down to the outlet when resorting to hysterectomy for cancer of the cervix. You were compelled to drag heavily on the uterosacral ligaments in order to get the uterus to the outlet. In making an incision through the anterior vaginal wall and separating the bladder from the uterus, there should be but little difficulty. I believe any skilful man can make this dissection, separate the bladder, and enter the peritoneal cavity in front of the uterus without injuring the bladder. In vaginal hysterectomy you will recall the difficulty you had in bringing the fundus of the uterus through the opening. I have attempted it a great many times, and I have not done it with ease. I have never felt that I had the sunlight shining upon it. It has been a troublesome thing to me, and I have always found some difficulty in doing it. The doctor raised an objection to using an instrument, on the ground that it might produce hemorrhage. The introduction of a double hook in the fundus of the uterus

would not produce much hemorrhage; but it might invite adhesions to the intestines. The same state of things would obtain when he shortens the round ligaments through such an incision. The ligament, when drawn down, is bruised by the forceps, the needle passed with silk ligature, making a fold of the ligament, will invite adhesions of the intestines at the points of puncture, and bruising. That is an objection to shortening of the round ligaments through an anterior abdominal incision. If the pathological condition is one which does not require an intrapelvic operation, there is no excuse for opening the peritoneal cavity whatever. The shortening can be done just as well by taking the ligament in its natural course, opening the external ring of the inguinal canal, thus making the operation an extraperitoneal one. If the peritoneal cavity must be opened, there is no necessity of puncturing the ligament at all. The ligaments can be shortened extraperitoneally after the peritoneum has been opened and all necessary work on the pelvic structures has been done.

The vaginal route is the one to be selected in cases of pus in the pelvic cavity, especially if the disease is acute. If the operator wishes to drain a pelvic abscess or to open a pus tube, in which the infection is recent and active, he will get better results, and it is certainly a much safer procedure, by opening through the vagina, just as the Doctor has recommended, rather than through the abdominal cavity. But in the later cases, with dense, firmly organized adhesions, in which the operator finds, as many of us have found heretofore, that scissors and vision both are absolutely necessary to make a safe dissection in the pelvis, the vaginal route is not, in my mind, the one to be chosen.

In cases requiring the removal of fibroid tumors from the uterus other than submucous ones, I cannot possibly see where any advantage comes from attacking them through the vagina. I have attempted it time and again, and I have encountered such difficulties as not to induce me to remove these tumors by any other way than through the abdomen. The trend of work at the present time is conservative, that is, to save everything we possibly can. By making an incision through the anterior abdominal wall, we can reach the pelvic structures without difficulty, and I believe all work can be done with more precision and with less sacrifice to healthy structures through an abdominal opening than through a vaginal one.

Dr. George R. Dean, of Spartanburg, S. C.—My experience has been limited in this class of work; but in cases of pus tubes and abscesses I have nearly always encountered bowel adhesions of such a nature that it was very difficult to deal with them satisfactorily, even by the abdominal route, and in cases like that I think we would run great risk in trying to do such work through the vagina, for the reason that we cannot see nor feel what we are doing, and we cannot bring the organs and

adhesions down where we can see them. In minor cases, however, which the essayist referred to, I think the vaginal route is better sometimes. In all cases of pus tubes, however, I think there is more or less bowel involvement, and this ought to be dealt with from above.

Dr. Guy L. Hunner, of Baltimore.—The doctor's method of draining through the anterior abdominal incision, it seems to me, is rather useless. If one should get into the abdominal cavity and find an abscess or an infected ovarian cyst, or anything of that nature, which he does not like to tackle in the presence of the intestines, the proper thing to do is simply to make vaginal puncture, guided by one hand in the abdomen and without disturbing the abscess from above. Thorough drainage is instituted from below, and then, not having an infected abdominal wound, this is closed. I do not think we need pay attention to the lining of the abscess. I think if you drain the abscess and leave gauze that will cause drainage for a long-enough period, the lining of the abscess takes care of itself. The great fault in this work, I am sure, is the removal of the gauze too early. Pulling out the gauze on the third or fourth day after vaginal puncture invites reaccumulation of the abscess.

I had particular advantages in having two wards in which I could follow series of cases after vaginal puncture, and I purposely withdrew the gauze systematically on the third or fourth day in the cases in one ward, while in another ward I left the gauze in for ten to fourteen days, and I found out that much better results were obtained by leaving the gauze in for a longer period of time, and I gave up removing the gauze early. Of course, cases differ. If you have an acute case, with a thin abscess wall, the gauze should come out earlier than in a case in which you have an old abscess with thick walls. In these latter cases the gauze ought to be allowed to remain ten, or, better, fourteen days. The abscess with thick walls contracts down and partially expels the gauze. When it is entirely pulled out, there is a large connective-tissue opening through the vagina which will remain open until the abscess granulates from the bottom; whereas, if you draw the gauze out early, the same amount of contraction does not take place immediately, and there may be a reaccumulation of the pus.

I do not think the forms of infection are clearly differentiated. Puerperal infections we ought to consider as being due to the streptococcus, unless they prove themselves otherwise, and we ought to handle them accordingly. Infections at other times are more often gonorrhœal. True, puerperal infections are sometimes gonorrhœal, particularly if bilateral and tubal. In the last issue of *American Gynecology* there is a report of a number of cases treated by one of our New York confrères through the vagina by conservative methods; but the whole article is weak-

ened, so far as I am concerned, because the author speaks glibly about "streptococcus tubes," and about recovery after streptococcus infection lying free in the pelvis and ascending to the peritoneum. All the streptococcus abscesses I have ever encountered do not do that, for if the streptococci get into the pelvis proper they are scattered broadcast throughout the cavity and result in death. The author does not state definitely his reasons for speaking of streptococcus tubes. We find these extremely rare. In a case of postpuerperal infection we ought to avoid the abdominal cavity, reaching high masses by an extraperitoneal incision; and if the abscess is located near the vagina, vaginal puncture should be made. I would make the differentiation in these cases, in the first place, by the history, and, in the second place, by the palpation characteristics. By the history we should be able to say almost positively before we go in whether we have a case of streptococcus or gonorrhœal infection to deal with. No matter if a patient had a normal convalescence after childbirth, if she has a history of semi-invalidism since childbirth and a subperitoneal pus accumulation, it should be considered as a puerperal affair, and the streptococci should be kept out of the peritoneal cavity. Pus tubes are generally gonorrhœal. We ought to be specific in differentiating the different forms of pelvic inflammatory disease, depending upon bacteriological tests.

I would like to ask Dr. Goffe how easy is it, in a case of prolapse or descensus of the uterus, with relaxed outlet and large vagina, one for which this operation is most favorable, to get at the uterosacral ligaments through the anterior incision?

I have given up ventrosuspension of the uterus entirely in cases of childbearing women. I shorten the uterosacral ligaments from within, as first suggested by Kelly, and the round ligaments by the Webster method, and I have been contemplating doing this through the anterior vaginal incision. In these cases we often have cystocele or a tendency to it, and we may wish to do a reparative operation on the anterior vaginal wall, and in this way would get a large opening through which to work, and if it is easy to get at the uterosacral ligaments and shorten them through this incision the remainder of the operation can be done that way. If we can get at the uterosacral ligaments, there is no doubt we can do the work through the vagina. In the Webster operation the round ligaments are brought back three or four centimetres posterior to their original plane of attachment, and in that way a great physical advantage is gained. We know that the round ligaments, when the uterus is in normal position, run laterally. The tendency is to pull laterally, but if the plane of attachment is set three or four centimetres farther back, one gains a great mechanical advantage.

Dr. J. B. S. Holmes, of Atlanta, Ga.—I have had very little experience in vaginal work. Some years ago I began to do it, but after doing a few hysterectomies I abandoned it, except in cases of early carcinoma confined entirely to the cervix and the uterus not at all fixed. I abandoned the vaginal method because I felt I was doing imperfect and incomplete work. In removing growths from the uterus I felt that I could separate the adhesions easier and more satisfactorily from above than from below, for, really, in many of these cases, I think it is fully as important to free the adhesions as it is to remove the diseased uterus. I have had no occasion whatever to regret my decision in the matter of changing from the vaginal to the abdominal route. Now I do no vaginal work, except vaginal puncture, with the idea in view of going in from above to complete the work, if necessary, or in the early cases of carcinoma as mentioned. In going in from above I find it a great deal easier to remove uterine growths, separate adhesions, and control hemorrhage. I have found it more satisfactory.

As for shortening the round ligaments, I have never done it by the vaginal route; I do it altogether through the inguinal canal, except where I have a fixed uterus, and then it is necessary to open the abdomen to liberate adhesions and shorten the ligaments intra-abdominally.

My experience is different from Dr. McGannon's with reference to always diagnosing correctly intra-abdominal troubles. I frequently open the abdomen and have no idea what I am going to find until I get in. In many cases I think I know what I am going to find, but I have been disappointed after opening the abdomen. I am not sufficiently versed in diagnosis to be always correct. (Applause.)

Dr. J. M. Baldy, of Philadelphia.—Do not be misled by the beautiful illustrations you have seen in connection with Dr. Goffe's paper. They are only pictures after all. I thought the angiotribe, like the hysterectomy serre-nœud, had been consigned to oblivion, had disappeared, and been lost for good and for all time, but I see it still appears in the pictures.

I have listened with a great deal of interest to the discussion of Dr. Goffe's method of doing vaginal hysterectomy, inasmuch as he said it was spreading in popularity, and I was anxious to see whether it had been popularized among our Southern confrères, but I have yet to hear the first voice raised in defence of it by a man who has had any experience with it. The more I see of vaginal work in expert hands, the more thoroughly I am convinced I shall not resort to it again, unless I am forced to. The older I become the more experience I have, the greater the respect I have for the method which makes an incision in the abdominal wall. It must be remarked that many of the men who have been the fathers of vaginal hysterectomy have practi-

cally given up the operation. Henrotin does this operation occasionally. He performs vaginal hysterectomy now in only a few cases. Segond came to America to convert us to vaginal hysterectomy, but went back converted to the abdominal route. Jacobs, a man who was imported by Henrotin, never touches a case now by the vaginal route unless he is forced to. Jacobs found it impossible to deal properly with all of the pathological conditions encountered by the vaginal route, and a gentleman told me, who has been familiar with his work for the last two years, that he had never seen him do a vaginal section. So I cannot see, for the life of me, where this operation is being popularized. There is more traumatism attending vaginal section in the ordinary work of dissecting off the tissues from the bladder, of laying open the peritoneal cavity, and there is not one single, solitary lymph channel that is not opened in this operation. Pryor cures a lot of puerperal cases by packing off the cavity with iodoform gauze and isolating the uterus, so as to shut off the infection from the general peritoneal cavity, so that free iodine gets into the blood and in that way kills the infection. He makes no anterior incision. Goffe is an advocate of the anterior, and Pryor of the posterior incision. Pryor takes iodoform gauze and packs it around the uterus posteriorly. Does iodine cure sepsis? No man has ever advanced a single scientific fact to prove that, and Pryor reaches his conclusions simply by inference. As there are so many loopholes in this theory, it is too wide of the mark for scientific men to consider. The traumatisms of vaginal hysterectomy, the stretching of the tissues, the uncertainty of the results should be considered carefully by those who contemplate doing this operation. Goffe, I believe, is the only man who does not exclude this method in cases in which the appendix is adherent to the mass. I have seen 150 of those cases, and experience has taught me that it is better to attack them through the abdomen. In many cases, not knowing exactly beforehand what has to be dealt with, it has become necessary for men to do abdominal section as an adjunct to vaginal incision.

Dr. Goffe (closing).—I knew when I came to Atlanta I should meet a great many of my friends; at the same time, I realized, to a certain extent, that I was bringing the vaginal operation into the enemy's camp. I am not surprised at the criticisms that have been made or the opposition shown in regard to this operative procedure. I was unable to read my paper in full, and I think, had I been able to follow out the technique and detail of the various procedures as described in my paper, I should have been more clearly and much more satisfactorily understood.

I mentioned the shortening of the uterosacral ligaments as one of the vaginal procedures. I am doing it frequently in appro-

priate cases. In procidentia, where the uterus is down to the vulva, or in cases of great relaxation of the ligaments, with the uterus low in the vagina, I frequently shorten the uterosacral ligaments through the posterior incision; then the round ligaments through the anterior incision. I regard the uterosacral ligaments as the essential structure in supporting the uterus in its normal position. If we can keep the cervix high in the hollow of the sacrum the fundus drops by gravity into its normal position. The tissues that hold the cervix up in the hollow of the sacrum are the uterosacral ligaments. Dr. Bovée, our honored President, has probably done more operative work on the uterosacrals than any man in this country, and he sometimes operates through the vagina, which you all doubtless know.

In regard to the criticism made by Dr. McGannon as to the term exploratory incision, I think he will admit that when he opens into the abdominal or pelvic cavity he does not know just how much conservative work he is going to do. He does not know whether he will remove the appendages on both sides; whether he is going to leave both appendages, or whether he is going to remove part of a tube or part of an ovary. That develops in the course of the operation. It is an exploratory incision, because he cannot say in advance what he is going to do. We are all confronted with this condition: I cannot tell absolutely whether I am going to remove the appendages when I enter the pelvis or whether I may be able to do some conservative work and preserve them. In that sense the primary incision is exploratory. When we remember the cases of sterility in which we have cobweb adhesions which hold the tube kinked and constricted or bind down the fimbriæ, and how impossible it is to recognize these before entering the pelvic cavity, we need not hesitate about the term "exploratory."

In regard to adhesions forming a roof over the gauze in the after-treatment, these adhesions gradually disappear. Take a large pelvic abscess, such as Dr. Baldy has described: You simply open into the pelvis from below and shell out the pus sac, and, although you may have a mass of adhesions binding together the intestines and making a roof over the cavity, after the infection has been removed these adhesions will gradually absorb and the intestines become absolutely movable. In a case in which the pelvis has been packed with gauze and the intestines lifted upon it out of the reach of necrotic tissue and raw surfaces, plastic lymph is thrown out and adhesions form, but these adhesions never become firmly organized. Unless infection invades them they disappear in the course of ten or fifteen days, and the intestines become movable. In many cases we have to deal with retroversion complicated by diseased appendages. Many of these patients also suffer from endometritis and lacerations of the cervix and perineum, and when we operate we meet

with all of those conditions. Now, what more convenient or logical course of procedure in such a case than to curette the uterus, repair the cervix, then open through the vaginal incision into the pelvic cavity, break up adhesions, do whatever radical or conservative work upon the appendages may be indicated, shorten the round ligaments, and, finally, sew up the perineum, and all without changing your position or that of the patient? That is a routine custom of mine.

With reference to letting the rays of the sun stream upon the parts as you are operating, I remember very well a discussion we had in reference to this matter in Chicago, when Dr. Henrotin said he did not want to work in the dark upon the appendages, but preferred to bring them out through the abdominal incision, where the sun can shine full upon them. I have frequently, in operating by the vaginal route in the Polyclinic amphitheatre, had the sunshine bathing the parts just as freely as Dr. Henrotin when operating through the abdominal incision.

In regard to the popularity of the procedure, I do not expect the older generation, who are established in their ways, to relinquish their hold on the abdominal method. We expect them to go on doing their laparotomies; we expect them to ignore any departure or new suggestion that will take them out of their accustomed field. But the rising generation of young doctors who are fitting themselves for pelvic surgery are finding out what an easy, ready route the vaginal method offers for attacking diseases in the pelvis. And the patients are learning how much safer and better it is for them, and are going to demand it. What I said in the opening of my paper is true. I am receiving letters from physicians in various parts of the country in reference to the popularity of this method. I had a letter this fall from a practitioner in Chihuahua, Mexico, after he had read a paper criticising the vaginal route. He said, "I want to write and tell you what I am doing in this line. You may not remember me, but I sat at your elbow for three months two years ago in New York and saw you operate. I came home and have been doing vaginal work ever since, and my results are so superior to those I have had before that when I do laparotomy again it will be because I cannot operate by the vagina."

I have nothing further to say, except that I appreciate very much the fair and candid discussion you have accorded me.

TUBERCULAR OSTITIS OF THE KNEE.

By A. R. Shands, M.D.,
Washington, D. C.

In selecting this subject for a paper before so distinguished a body of men as those composing the Southern Surgical and Gynecological Association, I feel as though I should offer an apology for again bringing forward so old a topic, for it will doubtless occur to many of you that this subject must surely be exhausted so far as anything the present writer can add; but no apology is needed for those of us who are especially interested in orthopedic surgery, for we see many neglected cases that remind us that some one is at fault, that these cases do not come into the hands of the specialist sooner. There is no more important subject in the whole range of orthopedic surgery than that of tubercular ostitis of the knee, and it is one that should be of special interest to the general practitioner, as these cases always come under his observation first; the surgeon rarely ever sees them until the disease is well advanced, and often not until considerable destruction of tissue has taken place.

While it is my intention to confine my remarks chiefly to the treatment of tubercular knees, it is eminently proper, at least, that the most essential features of the early diagnosis should be included, as the most important part of the treatment depends upon the early recognition of the disease.

The objective symptoms of white swelling of the knee-joint are usually so pronounced that error in diagnosis should not be made by one who has been properly instructed in or has given any special attention to this affection. In

spite of this assertion, I often see cases that have been treated for rheumatism until suppuration is well advanced or a deformity has occurred that will require active surgical interference to cure.

This mistake is often a very natural one with the average practitioner, for the disease is not a common one in his experience. I have not a doubt but that there are many among you, active practitioners of many years' experience, who have had no occasion to examine one of these cases since the time of your hospital training. My experience has shown me very conclusively that but few of these cases occur in the country; they are found chiefly among the inhabitants of the large cities who have bad hygienic surroundings. Nevertheless, no station in life is exempt, the rich as well as the poor have tubercular knees, and all of us should be on our guard and be instructed as to what symptoms to look for in every lame knee that might indicate the beginning of this affection.

The chief symptoms to be relied upon are local heat, swelling, muscular spasm, reflex atrophy of the muscles both above and below the knee, and tenderness. This is about the order of their importance. I wish to call especial attention to the local tenderness, or pain, which can often be located within a small area, often not exceeding the size of a silver half-dollar, over the head of the tibia or over one of the condyles of the femur. This tenderness on pressure is due to a localized periostitis just over the diseased focus. Comparison of the suspected joint with its fellow is very valuable assistance, noting the obliterations of the normal depression about the joint. These changes occur very gradually as compared with rheumatism. In measuring the lengths of the limbs it should be borne in mind that when the disease is well established the diseased limb as a rule will be longer, varying from one-fourth to three-fourths of an inch. This is due to an overgrowth being produced in the cancellous bone by the hyperæmia occasioned by the inflammation. Do not take any stock in

the history of some traumatism that the parents are always aware of the child having sustained. I have yet to see a case of white swelling in a child in which there is not a history of a fall or injury of some kind. Upon close questioning you will generally find out that the child was a little lame before the injury was received, and there hangs the true story. The disease is generally responsible for the fall to which so much importance is attached by the parents. The inception of the disease is so insidious, causing unsteadiness of the limbs, that it should give the fall its proper place in the history of the case. It should be borne in mind that pain is not often a prominent symptom in the early stage of the disease ; just the opposite is the case in rheumatism ; diagnosis of white swelling should be made long before pain is well pronounced. Localized heat, as well as localized tenderness, is present from the beginning of the disease, and is an important index to the progress of the case ; if the joint is kept perfectly quite it will disappear, to return at once if anything goes wrong. It should serve as an urgent indication for protective treatment so long as it exists in any degree. Muscular fixation, nature's effort to immobilize the joint, is a prominent feature from the first ; there may be a small arc of painless passive motion, but it will be checked by the muscular spasm just as soon as the limit is reached. Muscular spasm is much more prominent and constant in a tubercular knee than in any other affection of that joint.

The management of a case of white swelling can be embraced in the terms *immobilization* and *protection* in any and all stages of the disease. The indication is to preserve the function of the joint as far as possible, to arrest the progress of the disease, to prevent and correct deformities. Immobilization and protection with best hygienic surroundings and the best tonic treatment appropriate to the individual case will best accomplish the indication just mentioned.

If the diagnosis is made early and this line of treatment faithfully carried out the large percentage of cases will

yield very favorable results, many recovering with little or no disability. I wish it were possible for me to have you examine for yourselves some of the excellent results that I have obtained in cases treated early. The detail of the treatment must, of course, depend upon the condition of the patient when first taken under treatment. In the mild cases the immobilization of the joint with a plaster-of-Paris case and a pair of crutches is all that is needed. In this class of cases I do not use any form of steel brace, but do use the Thomas knee splint in cases in which the muscular spasm is so prominent a feature that the plaster-of-Paris does not afford efficient protection. It is an important question to know when to discontinue the mechanical treatment even in the mild cases, and, unfortunately, it is hard to tell just when this can be done without risk of doing harm. It should be continued in some efficient form just as long as there is any active disease present, which will be indicated by the symptoms described above as being diagnostic of the disease. The great advantage of this treatment is that it does not confine the patient to the bed. In fact, every means possible should be used to keep the patient out of doors. In applying the plaster-of-Paris case great care should be had to put at rest all of the muscles that have any influence over the motion of the knee. For this reason the plaster should extend from the middle of the upper third of the thigh to the foot. If plaster is properly applied it will relieve perfectly the painful spasm, and if you do not succeed in doing this the first time, then try again. Never use padding under the plaster, but have the plaster case skin-fitting. To do this you should have only one or two layers of a roller bandage under the plaster, except over the bony prominences, where a little lint cotton should be used. If you use cotton under the plaster it will in time roll up and pack to such an extent that the plaster case will become loose and you will not have efficient support.

Flexion deformity is a very early complication in all

untreated cases. Fortunate, indeed, do I think myself if I get a case before this complication is present. This complication should be remedied at the very beginning of the treatment. The means for this purpose will vary according to the degree of the flexion. When flexion deformity is present there is also much swelling about the joint, due to infiltration of the periarticular structures. This should first be reduced before attempting to straighten the knee, and can be accomplished by compression and fixation. The compression is gotten by strapping the joint with strips of rubber adhesive plaster, each about one-fourth of an inch wide, beginning about five inches below the patella, applying them diagonally around the limb in a criss-cross arrangement, extending them about five inches above the patella. This process is continued, overlapping each strip until the whole knee is snugly encased. Over this a thin bandage is applied, extending well up the thigh and down the calf, and over this is applied a plaster-of-Paris case. No attempt to correct the deformity is made at this time. This dressing should be allowed to remain on for about two weeks, and, if the flexion is due only to muscular spasm, when it is removed the deformity can be easily corrected with gentle manual pressure. If only a part of the deformity can be overcome with gentle force, then the same dressing should be applied for another period of two weeks, when, in all probability, the muscle spasm will have subsided sufficiently to allow light force to correct the remaining deformity. If such means are unavailing I will give the patient just enough anæsthetic to produce primary anæsthesia, when gentle manual force will complete the desired object. I use the expression "gentle manual force" advisedly, for a great deal of harm has been done by using too much force in straightening a knee that has been long flexed. By breaking up adhesions, the result of a tubercular inflammation, a new field for an inflammatory invasion is opened up, and it is very probable that a very acute process will develop and the second state of your patient will be very

much worse than the first. Again, there is great danger of rupturing the popliteal vessels by suddenly straightening a knee that has been flexed for a long time. I have seen just such a result gotten by a general surgeon who believed in "redressement force." The patient was a young adult with a knee flexed to a right angle, which was forcibly straightened at one sitting, with the result of rupturing the popliteal vessels. Gangrene of the leg followed, and an amputation was the ultimate result.

If the deformity cannot be corrected by a very reasonable amount of force in the early stage, then it had better be left alone until all indications of an active process of the disease have subsided, when it can be corrected by operative measures, which will be spoken of later on in this paper.

In many of these early cases where there is free passive motion within a limited arc it will be found that the flexion deformity is caused by contraction of the hamstring tendons, result of the muscular spasm having existed for a long time. In such cases it will be found that, by doing a subcutaneous tenotomy of these tendons, very little force will suffice to straighten the knee; this I often do when it is necessary to give an anæsthetic, for it is not only an aid in correcting the deformity, but adds greatly to the comfort of my patient after the knee is encased in plaster-of-Paris.

What has been said in this paper has to do with cases that have required no radical surgical interference; but, unfortunately, one who has to deal with many cases of this affection will frequently meet with some that have not yielded satisfactory results, even after having the greatest care bestowed on them along the lines indicated above. These are the cases that have gone on to suppuration when the ostitis has extended until the periosteum has given away and allowed the joint cavity to become infected with the germs of suppuration. When the synovial fluid is infected pus formation takes place, for synovial fluid is a fine culture medium for pus germs. When this condition has taken place there is present a process that is capable

of the most extensive destruction ; hence you are called upon to adopt a radical measure to save the joint. The operative procedure will consist, according to conditions present, of incising and draining the abscess cavity, arthrectomy, excision, or even amputation.

When it becomes necessary to incise and drain the joint, it should be done most thoroughly, and good drainage should be kept up just as long as there is any discharge. When the infection of the joint is due to an ostitis that is near the surface of the ends of the bone, often the diseased bone sloughs away, and when it can be easily located and curetted away most excellent results are obtained. As an example of this fact, the following case is given briefly :

Mary B., aged five years. She was referred to me in January, 1897. Upon examination I found her general condition good, well grown for her age, and had been a healthy child from birth. In the summer of 1896 she was noticed to be somewhat lame, but as the lameness was intermittent the parents did not pay enough attention to it to consult a physician for several months, when the lameness became constant and the knee began to give pain. She had no surgical attention until she came under my care, as stated above. At that time the leg was flexed to a right angle on the thigh and held rigid by muscular spasm. The joint was much swollen and extremely painful to the touch and to the least attempt at passive motion. At that time I failed to detect fluctuation in the joint. The knee was strapped with adhesive plaster, and a snugly fitting plaster-of-Paris case applied after correcting about one-third of the flexion deformity. This treatment was continued for about three months, when pus was detected in the joint. The child was then anæsthetized, incision made on both sides of the joint, pus let out, and the joint thoroughly washed out, and a tube put through the joint. The discharge continued for twelve months, when it finally stopped. At the time of the operation the limb was easily straightened and was kept straight by means of a plaster-of-Paris case until all

evidences of the disease had disappeared. Crutches were used for about eighteen months. When all protection was left off the child had about twenty degrees of passive motion. I examined this child the last time in January, 1902, five years after I first saw her, and really, to my surprise, I found that the motion at the knee-joint was almost perfect, and she walked without a halt. This case illustrates what good results can be obtained from treating such cases conservatively. This was evidently a case where the condyle was diseased near the surface, and a bone slough occurred by piecemeal and came away gradually in small pieces, allowing nature to heal the abraded surface as the exfoliation of dead bone took place.

This case was a most fortunate one to have gotten such good motion after suppuration. There are but few cases that get such good motion, even when no suppuration has occurred.

It would be well here to say a word about the very prevalent opinion among many who have not had an extensive experience in the treatment of chronic joint diseases that immobilization will produce ankylosis. It is a great mistake to think such is the case. My experience in the treatment of these cases is that the real function of the joint can better be preserved by absolute immobilization than by any attempt at a passive motion in a joint that is in a high state of inflammation, for ankylosis is produced by the products of inflammation and suppuration; therefore anything that will check these processes will limit the ankylosis, and it is a well-recognized fact that all wounds will heal more quickly the more perfectly they are at rest.

The operation of excision of the knee is a very old one. It was first done in 1782, and is still in great favor in certain cases. It should never be done in children except in extreme cases, and even then I believe that amputation would be best, for an artificial leg is more useful than such a leg as a child would have after excision. The epiphyseal cartilages are destroyed, and as a result the growth of the

limb is checked to such an extent that the limb will be from six inches to a foot shorter than its fellow when the child is grown. Instead of excision, the operation of arthrectomy is done in children. Excision is by far the best operation in adults, for the reason that quicker results are obtained by removing in this way the whole diseased area of bone, and the growth of the limb is not to be considered.

Arthrectomy consists in curetting out all of the diseased cancellous bone short of interfering with the epiphysis. This operation can be repeated from time to time, as indicated, until all disease has been removed, and most excellent results follow in the large percentage of cases.

It is hard for one who has not had experience along these lines to appreciate what liberties one can take with a bone curette in the heads of the bones of children; it is wonderful what can be done in this way. Nature seems able to replace almost any amount of bone in children, provided you do not destroy the epiphysis and will leave the periosteum. Hence the treatment in the case of white swelling in children when there is an extensive suppurative ostitis is to locate the diseased focus and to remove it with a bone curette, wash out the joint and keep up good drainage as long as there is any discharge, and protect the joint first, last, and all of the time, by producing absolute immobilization; and for this purpose nothing equals the plaster-of-Paris case, for with this you have the advantage of dressing the suppurating wounds through windows cut in the plaster.

It is not an unusual experience for the surgeon to have a case brought to him when nature has effected a most excellent result, so far as curing the disease is concerned; but the cure has taken place and left the knee in a very distorted position, then it becomes his duty to correct the deformity. The course to be pursued here will depend on what is necessary to be done. If the deformity can be corrected by a simple supracondyloid osteotomy without

the sacrifice of bone, it should be done at once; but if an excision is necessary the age of the patient must be considered, for if it is at a time when the growth of the limb is going to be influenced, then the operation should be delayed until such time has passed. Whenever the deformity can be corrected by removing an amount of bone, short of destroying the epiphysis, it can be done regardless of age, provided all acute symptoms have subsided sufficiently long to assure you that no active disease exists.

There is one important point in the after-treatment of the cases in children that deserves especial mention, and that is, that whenever the cases recover regardless of the treatment, whether operative or non-operative measures were used, with stiff joints the knee should be supported for a long time with some apparatus that will prevent deformity occurring. There is always a tendency for the development of either knock-knee or flexion. The most convenient and cheapest and at the same time a perfectly efficient apparatus is a plaster-of-Paris case. I generally use a leather case made of very stiff leather modelled over a cast of the knee. This has laces down the front of it, so that it can be readily removed.

As an illustration, I will give briefly here a history of a case in point:

Donald H., aged sixteen years, came under my care May 24, 1898, with the history of having developed white swelling of his right knee when about seven years old. He had a very extensive ostitis, and had been operated on numerous times at long intervals by two of the most eminent surgeons in this country. Operations consisted of abscesses galore, being incised and drained at different times; several years after inception of the disease, as the abscesses continued to develop, arthrectomy, or bone curettage, was done, and, finally, as scraping the bone did not relieve the condition, an excision was done with an excellent result, so far as curing the disease was concerned. The last surgeon who did the excision evidently did not

appreciate the importance of after-mechanical treatment to prevent recurrence of deformity. Several years after this operation, when he came under my care, there were thirty degrees of knock-knee and about twenty degrees of flexion present, with a firmly ankylosed knee. I did a cuneiform osteotomy at the seat of the old operation to correct both deformities. The wedge-shaped pieces of bone I removed were so shaped as to overcome both the knock-knee and flexion. The line of incision I made healed by perfect primary union; there was a superficial ulcer developed as a result of undue pressure of the plaster of Paris over one of the bony prominences of the knee. This ulcer healed in the course of a few weeks, with no bad result. After leaving off the plaster of Paris, I applied a stiff leather case, which was worn for several years. At this time the limb is in the same straight position in which I placed it at the time of the operation.

While above I practically condemned the operation of excision in children, it is the operation of choice in the adult knee affected with white swelling, for the reasons above set forth. I have very recently had an excellent case to illustrate the beauty of this operation in adults. The case was in a man, aged forty-one years, who had suffered with his left knee for about eighteen months. When I saw him, April 22, 1902, for the first time, the knee was much swollen, local tenderness well marked, although the whole knee was quite painful on the least attempt at passive motion. I advised immediate excision, which was done four days later. Upon opening the knee-joint through the usual semilunar incision, quite a quantity of straw-colored fluid came out. The entire capsule of the joint was much swollen, highly inflamed, and studded thickly with what appeared to the naked eye to be tubercles. Both the head of the tibia and the condyles of the femur were diseased. The entire capsule was dissected out and the head of the tibia and condyles of the femur removed. This wound was closed, and primary union resulted.

I last examined this patient September 1, 1903, and much to my delight I found that the result was all that could have been expected. This patient's average weight before his illness had been about one hundred and forty pounds. At the time I operated on him his weight was one hundred and eighteen pounds. At the time of this examination his weight was one hundred and fifty-three pounds, and he was in a fine physical condition, which was largely due to the excellent and thorough treatment he had had at the hands of Dr. W. M. Barton, of this city, for his general tubercular condition.

In conclusion I wish to state that there is no trouble of this nature that comes under the care of the orthopedic surgeon that offers as good results as this knee trouble if he will persevere in executing faithfully the line of treatment I have mapped out in this desultory paper. There are many details of importance that I have not been able to dwell upon in this paper for lack of time and space, but it has been my aim to throw out some hints that I trust will be of service to some of you, both in aiding you to recognize early the next case that comes under your observation and in helping you to institute appropriate treatment at the outset, and if I have succeeded I shall feel well repaid for the labor of preparing this paper.

DISCUSSION.

Dr. W. P. Carr, of Washington, D. C.—I want to say a few words in reference to the interesting paper of Dr. Shands and the instrument he has exhibited. I have seen much of his work, and he is certainly an expert with plaster of Paris and stiff bandages. I think a great deal of his success has come from having a good plaster-of-Paris bandage, and a good many of the bad results we have all seen too frequently have come from using plaster-of-Paris bandages that were not good. The bandages we buy are unsatisfactory. Dr. Shands undertook to point out some of their deficiencies, but that is hardly necessary. They have all the faults and none of the good points. The only plaster-of-Paris bandage I have ever seen that was satisfactory was one made with good crinoline, such as he has shown, and with good plaster.

He spoke of the method of straightening contracted joints very gradually, and with little or no force, and I can testify from my own experience to the very great value of that method of correcting contractures in tubercular disease of the knee, clubfoot and other cases. The amount of straightening we may get in a joint without force has been surprising to me. By simply straightening the limb as much as possible without force, and putting on a plaster-of-Paris bandage, keeping it on for several days, and then cutting it and straightening the limb again without force, I have found it invariably yield several degrees each time. This method has many advantages over forcible straightening at one sitting. In the extreme cases in which operation has to be done, the operation of partial arthrectomy, which he mentioned, is usually the best. It is surprising what good results can be obtained if only a part of the articular cartilage is left. The greater part of the articular cartilage can be cut off, and holes can be gouged through it into the shaft of the bone and still no interference will be had with the growth of the limb or with the final result, provided a layer of articular cartilage is left over the end of the bone; even an incomplete layer in which holes have been gouged with the curette.

Dr. W. P. Nicolson, of Atlanta, Georgia.—This paper is so timely and so important that I think it is rather unfortunate if it should go by without further discussion. It is interesting to know that a tubercular knee-joint is amenable to treatment with this simple form of dressing without the application of braces. I believe there is an idea generally prevalent among the members of the profession that ankylosis is produced where a joint is fixed. In conversation with Dr. Gibney on this subject, after applying dressings in the case of a little girl, I was told by him that the joint should be passively exercised, and that indefinite suspension of the joint had nothing to do with producing ankylosis.

I have had some experience myself as a general surgeon with inflammations of the knee-joint. I saw a young man from a city in this State who had a tubercular inflammation of the knee. Some fluid was drawn out of his knee and sent to a pathologist in New York, who pronounced it tubercular, and that in the first stage the only thing to do was to resect the knee-joint, pin the bones together, and give him a stiff joint. This was not done. That patient came to me; I applied a plaster-of-Paris dressing at my office; he went home, used crutches for a year, and now has as good a leg as anybody.

I have a child under my charge now who had a tubercular knee, well advanced, which I saw when the child was eighteen months of age. There was never any other dressing applied except plaster of Paris, and the child is now walking on the limb. He still wears the plaster of Paris, but there are evidences of there being a complete cure, and already he has fairly good motion, so that, of all

the joints that are subject to treatment by this method, the knee, as one of the common tubercular joints, certainly excels.

I was very glad to hear that we should not put cotton on a plaster-of-Paris bandage. For years I have been putting up fractures seen immediately after the injury, but have never put any cotton around the fracture at all. The plaster of Paris is always applied skin-tight over the skin, with no cotton padding around the seat of fracture. I have never yet had to cut the plaster of Paris off on account of swelling from fracture; but the idea that swelling under plaster of Paris and cotton is the same is purely paradoxical if the cotton is evenly applied over a flannel roller or simple gauze bandage. I have a patient now for whom I applied plaster of Paris, and have had others, and my idea has been that the application of a thick layer of cotton does away with the thing we want, and that is accurate support of the limb. There will not be swelling from the fracture if the fragments are evenly adjusted and a bandage is put on. I do not know of anything more valuable to us than the essayist calling our attention to crinoline and to the method of making his bandages. I saw Dr. Gibney put on a plaster dressing a few weeks ago and tell the patient to come back in eight months, and I said to him, "How do you make them last eight months?" He replied that the secret was the use of crinoline bandages. He applied a plaster-of-Paris jacket in one case, and told the patient to return in a year. One child had worn a plaster-of-Paris jacket for fifteen months, and when it was taken off it was as firm and hard as when it was put on. He said the crinoline bandages we buy in the market had the sizing washed out of the crinoline; they became too large, and could not be incorporated one into the other. Dr. Sayre called attention to the secret of using a small amount of plaster applied to cloth and rubbed vigorously into each layer as it is put on. You cannot do that with the crinoline you buy. I appreciate finding out what kind of crinoline will make those bandages, such as I have seen made at the Hospital for Crippled and Ruptured, New York.

Dr. Shands is to be congratulated on his ingenious device for overcoming the difficulty in properly distributing plaster.

Dr. Charles W. Oviatt, of Oshkosh, Wis.—There is one feature I wish to speak of in cases of osteal tuberculosis in which we can make an early diagnosis such as we have in children, namely, ignipuncture, or opening the localized small cavity with a Paquelin cautery, is sufficient not only to limit the tubercular process, but to effect a cure without any other operative procedure. It is a useful method.

Dr. George S. Brown, of Birmingham, Ala.—I think cotton should always be used under plaster dressings applied for fractures. On limbs that are very fat or muscular this is of less importance, as the fat and muscle take the place of cotton, as it were, in giving the bone room for slight movement, which stimulates

union, and gives room for the callus to form. I am sure I have had at least one case of non-union due to applying a plaster bandage too tight without cotton on a small bony arm and fixing it too immovable.

Dr. J. Garland Sherrill, of Louisville.—A word or two in reference to plaster of Paris. Dr. Shands' position in regard to the application of plaster of Paris for fixation is a quite different proposition to that of applying plaster of Paris in cases of fracture. I have had occasion once or twice in my experience to remove plaster-of-Paris bandages that were applied by others in cases of fracture. In some cases I have encountered gangrene as the result. It is dangerous to teach that a plaster-of-Paris bandage should be put directly in contact with the roller bandage next to the limb, owing to the fact that we may and do have swelling in some of these cases, and sometimes we may have injury of a vessel which we do not recognize, and especially is this bad if we have to stand the lawsuit, for the reason that the people believe this was the cause of the gangrene, whether it was so or not, and as a matter of protection in fractures we should give more padding than we would necessarily give in a case of joint trouble.

In the treatment of joint inflammations and bone inflammations near joints, I would suggest the use of adhesive strip bandages. I think frequently we can get fixation, warmth and support by the use of adhesive strip bandages, and frequently they will take the place of plaster of Paris without some of its inconveniences as regards weight.

Dr. Charles M. Rosser, of Dallas, Texas.—I did not hear all of Dr. Shands' paper, but I was very much interested in that part which I did hear. I want to mention the procedure which I saw Dr. Ferguson resort to in a case of tubercular knee-joint. He did not excise the joint exactly, but after it had been curetted by trimming away that portion which was diseased, the periosteum being redundant by virtue of the shortened capacity, and stitched it across to the end of the bone both above and below. I remarked at the time as to the possibility of pressure atrophy taking place, and he told me that in a short time this method of treatment would prevent it, and that during the time of fixation the ends of the bones would be held apart by this dressing. I was very much interested to know about the results, and learned afterward that they were perfect. The idea was to get immediate healing of the ends and immediate union of the periosteum, and on this account there would be less possibility of recurrence. Regarding protection in plaster-of-Paris dressings, I certainly believe it proper to have sufficient cotton to prevent pressure.

Dr. Shands (closing).—One gentleman, I think, spoke of a case in which excision of the knee was advised but not performed, and the patient got well. The question arises, what he means by

tubercular knee? We may have a tubercular synovitis which will present the clinical features very largely of tubercular ostitis, nevertheless the bone may not be involved. I have had a number of cases that have been puzzling to me as regards diagnosis, and sooner or later have become convinced that I had to deal with tubercular synovitis, and in those cases I have simply established through and through drainage, cutting the capsule on either side, putting a tube through the joint, and keeping up daily irrigation for a time with some mild antiseptic. Boracic acid or normal salt solution is sufficient.

I recently had the case of a young man who had been suffering for a year or more, but he got entirely well from this treatment.

With reference to the danger from the use of plaster of Paris in fractures, I did not speak of that in my paper, although it is a point well worth mentioning. Of course, following an acute traumatism of any limb we expect to get considerable swelling, but such a limb can be put up in plaster of Paris without any padding, with a degree of satisfaction that we are not going to have trouble, if we allow for the swelling.

Every Colles' fracture I put up within three or four hours of the accident, I split the plaster with a knife through to the under bandage on the ulnar side of the forearm and pry the cast apart for about one-half inch, as the bandage is sufficient to hold the plaster in place, and as the swelling goes down you can bring it back. If you watch the case you can pry it open, if it is not open sufficiently. In a case of fracture of the lower leg, if there is swelling, it is due to pressure on the return circulation by the plaster-of-Paris cast, and if you continue the plaster over the foot, in putting up a hip case, for instance, you will get perfect immobilization and there will be no swelling. I always extend the plaster of Paris from the hip itself down, and have never yet seen swelling of the limb if the plaster was extended beyond the joint below the seat of injury.

With reference to plaster of Paris and crinoline lasting a long time, I worked with Dr. Gibney for two years and what little I know about plaster of Paris he should be given credit for. I think he is a genius along that line. By the use of crinoline I have put on plaster-of-Paris jackets on spinal cases which have lasted for twelve months frequently. A few years ago I had the opportunity of applying a plaster cast and sending the patient to Honolulu. It was a case of clubfoot. I appreciated the importance of keeping the foot in an overcorrected position, and the child walked on it in this overcorrected position to convert an equinovarus into a talipes valgus. I put it up in plaster, extended the plaster well over the toes and well up the leg, left it on as long as it would stay, and allowed the child to walk on it. The patient wore the plaster cast for a year. I had used caution in splitting

it so that it would expand as the child grew, and applied adhesive strips to hold it.

I have not had any experience along the line of destroying a tubercular focus by the use of the Paquelin cautery. I have done practically the same thing where the disease was in the head of the bone. Where it is possible by means of the *x*-ray to locate the focus of infection, the best treatment to adopt in such a case is to trephine, and with a Volkmann spoon you should not only remove the diseased area, but go beyond it. You need not hesitate about destroying bone, as nature will replace it, provided you do not destroy the epiphyseal cartilage.

THE DIFFERENTIAL DIAGNOSIS OF LUPUS, CANCER, SYPHILIS, AND RODENT ULCER OF THE VULVA.

By Barton Cooke Hirst, M.D.,
Philadelphia, Pa.

It may seem a waste of time to invite the attention of distinguished and experienced specialists to the problem which gives the title to this brief communication. My colleagues, however, whose hospital work brings them in contact with the rare and more malignant types of syphilis, occasional cases of lupus and of carcinoma of the vulva, will agree with me, I believe, that the question is not always easily settled. I have read of mistakes in diagnosis in recent literature; I have seen such mistakes made, and in some of my most recent cases a prolonged, careful study has still left some doubt of their true nature. The subject is still further complicated by the extreme difficulty sometimes encountered in the diagnosis of lupus.

A typical case of syphilis and a typical case of cancer are easily differentiated. A number of illustrations might be presented from the writer's hospital services illustrating this point, but they have been published elsewhere. A typical case of lupus should also present no great difficulty in the diagnosis, but, as we all know, our cases are not always typical. Without further preamble, the presentation of the subject may be justified by the description of a case the true nature of which remained doubtful after an observation extending over more than two months and the utilization of all the modern aids to exact diagnosis of which science is at present possessed.

Fig. 1.

Lupus of vulva.

Fig. 2.

Carcinoma of vulva.

The woman, aged twenty-eight years, is single; has never been pregnant. She denies ever having led an immoral life and the possibility of venereal infection. Ten years ago she was operated on in the Pennsylvania Hospital for hemorrhoids and fissure in ano. She says the wounds of the operation never properly healed. More than a year ago she noticed an ulcerated condition of the vulva, and a short time afterward incontinence of feces, followed soon by incontinence of urine. For two years past there has been amenorrhœa.

On examination the vulva presented the appearance illustrated in Fig. 1. On a specular and digital examination, a fistula between the fossa navicularis and the rectum was discovered. The whole urethra was gone, three little tubercles at the neck of the bladder being all that was left of it. The vagina above the neck of the bladder was perfectly healthy. The cervix was normal, except that it was atrophic, as was the whole uterus.

The case at first sight looked like an inoperable epithelioma of the vulva. It was pronounced to be so at first by one of the most experienced dermatologists in Philadelphia, to whom it was shown. But there was none of that extensive infiltration and elevation of the skin surface around the edges of the ulceration, such as is exhibited in Fig. 2, a fair example of an extensive epithelioma of the vulva, considerably advanced, but not yet inoperable. Moreover, numerous pieces of tissue from different places in the ulcerated area showed nothing characteristic of cancer. There was everywhere the most extensive round-cell infiltration and necrosis of tissue. The microscopic study, as well as the macroscopic appearance, suggested syphilis in the ulcerated gummatous form as the most likely possibility, epithelioma being excluded. Accordingly, the patient was put on specific treatment, in spite of her negative history and the entire absence everywhere in or upon her body of signs indicating an old syphilitic infection. The treatment was given up within a week, as the patient was severely ptyalized and could not endure large doses of potas-

sium iodide. Lupus next suggested itself. On three separate occasions, under anæsthesia, twelve or fifteen pieces of diseased tissue were removed for microscopic examination. No tubercles nor bacilli could be discovered anywhere in the first two examinations. Inoculations in animals were negative. The urine contained no tubercle bacilli. The bladder itself was healthy. There was a decided response to the tuberculin test, but the woman had a patch of consolidation in the apex of one lung.

It was only on the third examination, after two pathologists had pronounced against tuberculosis, that a third found indubitable evidences of it. Meanwhile the patient was given *x*-ray treatment every other day for eight to ten minutes. Within three weeks the external ulceration was healed. Two weeks later the rectovaginal fistula spontaneously closed under the continuance of the *x*-ray applications. Nothing remained therefore of the original disease except the absence of the urethra and an elephantiasic condition of the labia majora. The former has been corrected by urethroplasty. I have not yet joined the new urethra to the opening in the bladder, so that the establishment of continence of urine is still doubtful; but I am quite hopeful of making the patient eventually entirely comfortable.[1]

My colleagues will recognize that this was a genuine case of lupus vulvæ. The fistula in the fossa navicularis and the entire absence of the urethra were regarded as characteristic of rodent ulcer at first. I failed to see the case at the time when the lateral walls of the urethra were eaten away and the posterior urethral wall hung loose in front of the vulvar orifice, but it is fair to assume that this stage of the disease must have preceded the condition which existed when I first saw the patient, making the case appear more typical still of so-called rodent ulcer. I have always entertained the suspicion that so-called rodent ulcer, not lupus or epithelioma, must always be an expression of syphilis. It is difficult to con-

[1] The urethroplasty was a failure. The denuded area was infected with tuberculosis and broke down

ceive of a specific kind of ulceration not syphilitic, not tubercular, and not cancerous that always does the same thing, perforates the bowel and destroys the urethra. In this case of mine there is additional evidence against rodent ulcer as an entity among the diseases of the vulva, and it is time, I believe, to drop this meaningless and misleading term.

It would be interesting and instructive to hear the opinions on this point of our fellow-members whose general surgical work gives them a larger experience in ulcerative syphilis, carcinoma, and lupus than falls to the lot of the specialist in gynecology.

DISCUSSION.

Dr. George R. Dean, of Spartanburg, S. C.—I would like to ask the essayist whether he used the violet rays or the plain *x*-rays?

Dr. Hirst.—I used the plain *x*-rays.

Dr. H. A. Royster, of Raleigh, N. C.—I am sure the question of differential diagnosis between syphilis and cancer of the vulva comes up more frequently than one is led to believe. A simple macroscopic appearance of these growths and often a thorough investigation do not always clear up the diagnosis.

I recently performed excision of the vulva for a very widespread growth which I took to be condylomata due to venereal disease, as the patient was typical of that class, so that I had no hesitancy in saying that the three causes of condyloma were present, namely, excessive venery, uncleanliness, and venereal disease. I think we should look more carefully into these growths in the future, and Dr. Hirst's paper is timely for that reason. I do not know that this question has been brought to the attention of the profession sufficiently in the past, but it is well worthy of consideration,

Dr. Hirst (closing).—I have very little to add. I shall be glad to hear the opinion of the surgical members of the Association in regard to syphilis or tuberculosis and rodent ulcer. To my mind there appears to be an association between them, although it is a disputed point in the pathology of the condition.

NEOPLASMS, WHEREVER SITUATED, SHOULD IF POSSIBLE BE REMOVED, WHATEVER THEIR APPARENT NATURE.

By Maurice H. Richardson, M.D.,
Boston, Mass.

However desirable in the abstract conservatism in our resort to surgery may be when regarded as a general rule of conduct, too great reliance upon conservative ideas in medical thought and action cannot but result in harm. Under the teachings of what may be called a "strenuous" conservatism I am convinced that much unnecessary suffering is caused; that conservatism, for example, which, in the developing of an acute appendicitis, postpones operation until the surgeon is confronted by a general peritonitis; that conservatism which, in a well-recognized history of gallstones in the gall-bladder, permits impaction of stones in the common duct, whence, to prevent almost inevitable death, they must be removed by operations of the greatest danger; that conservatism which forbids the exploration of a small intestinal tumor until, by infiltration of contiguous coils, a hopeless disseminated cancer is found at exploration made necessary by symptoms of intestinal obstruction; that conservatism which, in the treatment of breast tumors, instead of demanding instant and thorough extirpation, encourages the hope that the tumors are nothing but "enlarged glands" until those extensive cancerous infiltrations so unmistakable to the experienced eye have made the prognosis, even after the most radical operations,

practically hopeless. In such cases does true conservatism mean palliation and late operation, or the earliest possible surgical intervention? Is it conservatism to postpone the removal of a tumor on the ground that it is benign and harmless, when the success of the operation and the cure of the patient hang upon the correctness of the diagnosis? Is it conservatism to watch a mammary tumor diagnosticated as a cyst, to find at a late operation that cyst bulging with malignant contents and the axillary glands perhaps infected?

The word *conservatism* demands—perhaps more than any other—a definition of its real meaning. Conservatism, as applied to surgical cases at least, usually implies non-operative treatment. The word is also used to express what is frequently spoken of as "the benefit of the doubt," when, for example, in appendicitis the patient is advised against operation that he may enjoy the benefit of the doubt (an extremely doubtful benefit, it may be added).

True conservatism, as applied to surgical cases, should mean the conservation of life and health, not the conservation of tumors, diseased appendices, gallstones; it should mean the preservation of life and the promotion of health by the destruction of all threatening elements—the excision of diseased appendices, the removal of offending gallstones, the extirpation of tumors.

The present communication was suggested two or three years ago by a serious contemplation of the following case:

E. H. M., aged thirty-five years, a plumber, consulted me on December 23, 1898, for a painless tumor in the pectoral border of the left axilla. He had noticed it two years before, since which time it had increased a trifle in size.

I found a small tumor at the anterior border of the left axilla, partly covered by the pectoralis major. The tumor was freely movable under a non-adherent skin, and, though rather hard, suggested a lipoma. I advised the removal of the tumor, but did not impress upon the patient that removal was important or essential. I told him, he now

says, that if it were mine I should have it out immediately. In a word, he felt about the tumor—as I certainly did—that it was a matter of slight importance, and that one time would be as good as another for removal. Of the physicians in his own city, one urged operation; others did not.

On October 31, 1900, nearly two years after my first examination, the patient came to me, asking to have the tumor removed, because it had grown so large as to be "in the way." I found a large, somewhat irregular tumor filling a considerable portion of the axilla and extending toward the clavicle. It had lost the appearances suggestive of a lipoma. The rapidity of growth and the irregular outline suggested strongly a sarcoma. Operation showed it to be, in fact, a round-celled sarcoma. It had grown into and around the axillary vessels. Complete extirpation was attempted, but the result of the dissection was unsatisfactory. The patient made a good recovery from the operation, however, and returned to his work.

On October 14, 1901, the patient returned to me, saying that he had been perfectly well, had been able to attend to his work, and was in every way in splendid health. He had just noticed, however, what he thought to be a return of the tumor. Total loss of taste and smell since the first operation suggested the possibility of a cerebral metastasis. I found the axilla again filled with new-growth, which on October 22d I tried to remove. It was impossible to enucleate this mass without sacrificing completely the axillary vessels and nerves. The hemorrhage was alarming, and almost impossible of control.

In view of the extent of the disease, of the hopelessness of further dissection, and of the patient's good general condition, I suggested, as the only possibility of cure, amputation of the whole left upper extremity. The young man was unwilling to undergo this sacrifice, especially as I was unable to assure him even then of permanent recovery. I therefore sent him to Coley, who, by means of his toxin treatment and the *x*-ray, was able to show before the Amer-

ican Surgical Association in 1903 this patient entirely cured. Such a fortunate result, however, can rarely be expected. For all practical considerations, this case must be classed among the hopelessly inoperable and included in the data upon which to base the conclusions of this paper.

This case is one of the most conspicuous examples that I can recall of the dangers of leaving to itself a small tumor apparently benign. The failure to operate was the result of a mistaken diagnosis. My opinion as to the benignancy of the growth was strong, and that confidence of opinion was itself based upon a large experience in mammary and axillary tumors. Was it justifiable to rely upon that opinion when early extirpation of the tumor would have been without danger, and, in case of malignancy, probably effectual? Has a surgeon the right to say, "Let the tumor alone; it is nothing serious," when the patient will have to pay with his life the penalty of a mistaken opinion? From this point of view it would seem that he has no such right, and, furthermore, that he is not called upon to take such heavy responsibilities when by operation the solution of the difficulty is easy and safe.

About the time I saw this man an intimate friend of mine, a physician, showed me among the posterior muscles of the upper arm an irregular tumor about the size of a lemon. The skin dimpled over this tumor in various places, and it seemed to me to have the characteristics of a lipoma. I advised this patient, when convenient, to have the tumor removed, but assured him that it was a lipoma, and that one time was as good as another for operation. When the previous patient came to me with his axilla full of the growth, and when at operation I found the growth to be malignant, I at once thought of my friend's case, and sent for him for examination. I was eager to convince myself again that the tumor was a lipoma. To my dismay, this tumor had increased in size, and felt so hard and nodular as to suggest malignancy. I then felt that he had, in his confidence in my opinion, neglected the favorable opportunity for an

early operation and an effectual one. I insisted upon immediate operation. To my great satisfaction, I removed a simple lipoma.

The remedy that suggests itself for the disasters of the first case is a more accurate means of diagnosis by which such mistakes may be rendered impossible. The only means of diagnosis before removal of the tumor is in a section made with the knife, or in a portion of the tumor withdrawn by means of needle or of punch. This means of diagnosis, however, cannot be relied upon in doubtful cases any more than the history and gross appearances as interpreted by an experienced observer. Moreover, it is applicable only to accessible tumors, in localities free from dangerous structures. Inasmuch as the specimen removed must necessarily represent but a small portion of the tumor, it is clear that deductions drawn from an examination of that specimen must often prove untrustworthy. In most of the doubtful tumors upon which this paper is partly based, the section of the punch would have proved not only inaccurate but misleading. Moreover, in many tumors and in all intra-abdominal growths, this method is even more dangerous than free exploration. I shall therefore assume that the benignancy of tumors can be proved only in the laboratory and by the most extensive and painstaking examination. It need hardly be mentioned, of course, that positive evidence of malignancy by sections or by the punch—except in closed cavities like the abdomen, the thorax, or the cranium—are generally possible before excision; and that such evidence of course demands operation, if operation is possible.

The method of withdrawing a section or a cylinder by means of needles or punches has the insuperable objections that (1) a section may be relied upon which does not present the true characteristics of the tumor, and (2) healthy tissues may be infected in withdrawing the punch. (See *Boston Medical and Surgical Journal* of October 27, 1898—"Two Cases of Cancer of the Breast, Illustrating the Dan-

gers of Exploratory Puncture as an Aid to Diagnosis in Doubtful Breast Tumors.") The punch and the needle are impracticable, uncertain, and dangerous. Even the section by means of a knife is, in my opinion, objectionable, more objectionable than extirpation, for the danger of infecting with malignancy the freshly cut areas of healthy tissue is a real one. All tumors should be regarded as malignant until they are, by the most painstaking examinations, proved benign. It is clearly impossible to prove a tumor benign while it is still in the body. A part may be removed and may be subjected to the most exhaustive tests. This part may, however, fail to represent the real character of the neoplasm. Time and again I have found in the centre of a benign tumor evidences of malignancy which only by mere chance could have been detected by exploratory puncture or incision.

On October 25, 1888, a girl, aged twenty-two years, consulted me for a lump in her right breast. The tumor, situated in the lower internal quadrant of the right breast, at times was painful. My records do not state what my advice to this girl was, but she now says that I advised her to let the breast alone.

On October 5, 1901, she came again, showing a large tumor at the axillary border of the right breast, with a chain of enlarged glands extending into the axilla. The breast itself was not involved, except at the very border next the axilla. No sign of any lesion could be detected at the seat of the tumor examined by me in 1888. The tumor, with the breast and axillary contents, was removed October 19, 1901. Dr. Whitney's report was medullary cancer. Recovery from the operation was rapid, but there were early recurrences, for which several operations were performed. Death took place in a little over one year from the time of the first operation.

The treatment of malignant tumors by excision is discouraging. As a rule, I think, the more experienced the surgeon in the excision of malignant growths, the greater

the discouragement. This is perhaps natural; for, with an increasing number of cases, he is impressed more by the unfavorable ones than by the favorable, for many of the unfavorable cases are attended by grief, suffering, and mortification which cannot but impress him deeply, whereas many of the favorable cases escape his subsequent notice altogether.

One reason why the results are discouraging—indeed, the chief reason next to the malignancy itself of the tumor —is to be found in the so-called conservatism of both patient and physician. In a large proportion of the breast tumors that come to me there has been conservatism—that is to say, delay—local applications, internal medication—in a word, a wrong diagnosis.

I regret to say that in the past year or two many tumors, especially of the breast and of other easily accessible regions, have come to me after prolonged treatment by the *x*-ray. In all of these the disease has become so extensive that radical operation has been almost impossible, and even when radical operation has been performed, recurrence has been the the rule. I cannot but oppose this use of the *x*-ray in the treatment of all operable tumors, excepting only those which are entirely cutaneous and cannot be removed by dissection without serious disfigurement, for I have seen no permanently beneficial results in other forms of cancer by its use. In some instances this treatment has been carried on for a year or more. In many cases, it is true, the tumor has been far advanced and well-nigh inoperable when first discovered by the patient.

There is, I am convinced, no essential difference in the malignancy of cancer in one place and cancer in another. The rapidity of growth and the tendency to metastases depend upon the nature of the soil in which the disease is implanted. The soft, vascular, and juicy organs like the tongue, the liver, and perhaps the kidneys, favor the most rapid development and spread of the disease. The hard, dry areas with scanty blood supply—the lip, the skin, the

uterine cervix, the pylorus—resist the rapid development and spread of the disease. Cancer of the lip, like epithelioma of the skin, permits the greatest percentages of recovery after thorough extirpation. Cancer of the cervix uteri, of the uterine body, and, I fully believe, of the pylorus or of the sigmoid flexure, will give a large percentage of permanent recoveries if it is ever possible to attack these lesions as early and as vigorously as cancer of the lip.

The complacency with which an experienced surgeon views cancer in one place, and the discouragement with which he views it in another, are necessarily based upon his own experience. Even if the results of other surgeons in certain classes of cases are brilliant, his own failures in these same classes make him always skeptical in undertaking them. Invariable recurrence after hip amputations for sarcoma of the femur cannot but discourage me in this class of cases, though others have had successes after this operation. So, too, a high percentage of permanent recoveries after breast amputations for cancer has but little encouragement for him who has himself seen after this operation a high percentage of recurrences.

I am convinced that the results in cancer would be very different were it possible in all cases to operate as soon as the tumor is discovered.

The prognosis after operation in cancer of the lip is very different from that in cancer of the cervix uteri—one is so fatal, even after the most extensive operations, that doubts are entertained by the most experienced surgeons as to the justifiability of operation; whereas the other is almost certain of cure. What makes the difference? Is it not the lateness of operation upon the cervix uteri, and the timeliness of operation upon the lip? When cancer of the lip has extended into the mucous membrane covering the jaw, or into the periosteum, or into the submaxillary space, then its fearful nature is apparent, and then only is it to be compared in excessive mortality with cancer of the uterine cervix. Could we attack the cervical disease when it is as circum-

scribed as are many cases of cancer of the lip, it would then have just as good results.

The time to operate in cancer is at the very beginning; not when cancer is apparent, but when it is suspected; not when even the microscopic diagnosis is clear, but when it is doubtful. I would go farther than that and say that the time to operate in cancer is when the macroscopic and microscopic evidence is in favor of benignancy—in a word, in every case of tumor, malignant or benign.

I, for one, have been a long time in coming to this radical conclusion. I have been forced to it against my will and natural inclination—forced to it by not a few unhappy experiences such as I have already detailed.

I would advise excision of operable tumors of all kinds and of all places, not dependent upon blood diseases, unless the danger in the operation exceeds the danger of non-intervention. In healthy individuals I should advise, in the first place, the removal of moles and warts of the skin, especially of the pigmented kind; of wens, fibromata, and lipomata; of all neoplasms of tongue and fauces—including mucous cysts and papillomata; of all areas of keratosis; of suspicious spots upon the lip; of tumors in the neck—tubercular, cystic (hydrocele of neck), malignant, leukæmic (except in those conditions of the blood which contraindicate operation); and of goitres not dependent upon constitutional conditions; of all tumors of the breast; of all abdominal tumors; of tumors of bones and joints. So general a rule, however, admits of many exceptions.

In the case of external tumors, always open to examination, the question of excision may be determined after prolonged study. Many things may influence the decision, such as disfigurement, impairment of local function, and the ever-present danger to life, trivial though it be.

On the other hand, the decision for or against operation in cases of new-growths discovered in the course of abdominal operations must be made on the spot, without time for examination or for reflection. It is perhaps in this class of

cases that the rule of universal extirpation, when possible, should apply; and yet here danger to life itself rather than disability must be considered. Danger to life and disability due to operation must be balanced against danger to life and disability likely to result from the tumor itself. The rule of attacking and removing growths discovered in the course of abdominal operations seems to me a good one, but one which admits of many exceptions.

Did space permit many cases illustrative of the benefits of the rule might be given from my records. A few examples are conspicuous.

In my service of 1901 at the Massachusetts General Hospital there was a young girl suffering with the most intense epigastric pain. The diagnosis was obscure—lying between acute gastralgia, gastric ulcer, and gallstones. After prolonged study of this case, I decided to operate. On exploration, however, I found nothing but a flattened wart-like growth on the anterior surface of the pylorus. This growth was about the size of the thumb-nail, and seemed to involve only the outer coats of the stomach. The operation left a gap in the pylorus much larger than would be expected after the removal of so small a tumor. This opening I closed with interrupted Lembert sutures. The patient did well, but was not relieved of her pain. Dr. Whitney pronounced the tumor beginning cancer.

This operation gave the patient the best possible chance of recovery from pyloric cancer. Had the tumor been left to itself, it would slowly have increased in size and in depth, and, long before the diagnosis could have been made, would have developed into an infiltrating, inoperable tumor. The disease was analogous to the scale upon the lip seen in the earliest stages of epithelioma, and early and thorough excision should prove equally efficacious.

In the consideration of my proposition we must include the growths in the abdomen apparently malignant and those apparently non-malignant. The former, I take it, should always be removed, even if the malignancy is only

suspected. The latter may be removed on the chance of malignancy, upon the possibility of a mistake as to benignancy, upon the probability of future malignancy, or for the prevention of such future ills as pressure, great size, and other symptoms likely to appear in each special case.

There are many tumors which, apparently malignant and nopeless, prove to be benign and easily removed. One meets constantly with examples of this kind. The scope of this communication does not permit a discussion of this class of tumor. I have seen, however, many cases which on first examination, seemed beyond the surgeon's art, but which, on exploration, proved easily curable. One must not, therefore, be too hasty in concluding that hopelessness is, because apparent, real.

Many years ago I advised a man against operation on the ground of the extensive and infiltrating nature of a tumor in the epigastrium, presumably of gastric origin. Encouraged by Dr. Warren, however, I later explored this tumor and found it to be a tense pancreatic cyst, the drainage of which proved to be permanently effectual. This case has already been reported.

In another case an extensive, irregular, hard tumor of the abdominal wall seemed to justify the diagnosis of hopelessness. The trouble in this case proved to be extensive tuberculosis of the tendon sheaths of the rectus muscle. Free incision, thorough curettage, and drainage worked a cure.

In several instances—three especially seen in last year's service at the Massachusetts General Hospital—the tumor proved to be an abdominal manifestation of actinomycosis. Although I did not make a diagnosis of cancer and hopelessness in all these cases, in one of them I was positive that I had to deal with a gastric cancer that had infiltrated the omentum and the parts about the epigastrium.

A tumor at the ileocæcal valve gave rise in another case to a mistaken diagnosis of appendicitis. Although no diagnosis of hopelessness or of malignancy was made in this

case, there was a well-defined tumor which, with the history, made the diagnosis of appendicitis almost positive. I removed a small fish-bone from the centre of the tumor.

The number of cases which I have been inclined to regard as malignant and hopeless is surprisingly large—so large that I have been forced to explore in many instances because it seemed to me that my own opinion could not be sufficiently accurate to deny the patient the chance of cure on the ground of mistaken diagnosis. Many ugly-looking abdominal tumors have proved to be in reality benign. On the other hand, many apparently benign tumors, as I have said, have proved to be malignant. I could mention several instances of tumor of the kidney which, apparently malignant, were benign. On the other hand, I have seen a few renal tumors apparently benign which proved to be malignant. With reference to tumors of the stomach the greatest care must be exercised. I have seen a benign tumor about the pylorus present every appearance of malignancy. In the special case which I have in mind the pylorus was thickened, nodular, irregular, and the lymph glands were apparently infected. The patient had the history and the physical signs of cancer. Although a clever diagnostician, Dr. Joslin, had made a diagnosis of chronic ulcer of the stomach in this special case, I, with the tumor in my hands, made a diagnosis of cancer. I resected the pylorus for this tumor, and it proved to be, in fact, the tumor of a chronic ulcer. As a rule, however, gastric tumors must be regarded as malignant, for cancer of the stomach which can be palpated is much more frequent than any other form of epigastric tumor. Benign tumors of the stomach are so unusual that one seldom errs in assuming that every tumor connected with the stomach is in reality a malignant one.

There is another class of abdominal tumors suggested by the consideration of the previous case. These are the malignant tumors, apparently inoperable, which prove at autopsy to have been operable. I know of no more distressing circumstance than the discovery at autopsy of a

condition of things which by operation might have been remedied. The fear lest one leave a patient to die from a lesion which, though in reality operable, is thought at the time to be inoperable, has a tendency to lead a man into operations which not only can do no good, but which work positive harm. There are few surgeons probably who have not found themselves carried along into an operative procedure from which they could not extricate either their patients or themselves. The surgeon, once having undertaken a certain operative procedure, cannot abandon it until it is completed, although he realizes too late that the operation will be of no benefit whatsoever. It is one thing to examine in the full light of day a specimen of cancer of the sigmoid flexure which has been removed from the body at autopsy; and it is quite another thing to form an opinion in such a case through an incision admitting a finger, or the hand, or even through an incision large enough to make possible thorough palpation and inspection. I know of nothing more difficult than the diagnosis of inoperable intestinal cancer. It is much more common to attempt the extirpation of an inoperable cancer of the intestine than it is to abandon as hopeless a case which is in reality favorable for complete extirpation. The question of the possibility of extirpation, however, is one which is not in reality included in the scope of this communication. It is assumed that the question of extirpation applies only to those cases in which thorough extirpation is possible. It may be said, however, that there are few cases given up as hopeless in which thorough extirpation is clearly possible.

In pelvic tumors, especially ovarian, the tendency to malignancy is unquestionable. In some forms of benign tumors there is an early tendency to invade other structures. I have seen in dermoid tumors of the ovary a marked tendency to grow into the intestines. In two cases I have found the tumor growing through the intestinal walls. In one the tumor had not become infected; in the other it had become, through contamination by intestinal contents, necrotic and

gangrenous. In both these cases the operation was of great difficulty, but both patients recovered. I have come to regard the removal of the appendix as a justifiable procedure in the course of all abdominal operations in which it is easily accessible, provided the patient's general condition permits; and I am inclined to think that the removal of gallstones should be attempted in the same way. Both are prophylactic operations of great efficacy. So, too, I am fully convinced that abdominal tumors discovered during operations for other things, should if possible be removed. Many things are, however, to be considered in answering this question: When an operation is undertaken for the simple removal of the appendix—a comparatively safe procedure—is one justified in removing an ovarian tumor or a uterine fibroid—operations perhaps of considerably greater magnitude? Or, to take another case, suppose that in an operation for the removal of a small ovarian tumor one should find a cancer of the sigmoid flexure. I have no doubt whatever that the discovery of an operable malignant tumor in the abdomen—such a tumor, for instance, as cancer of the sigmoid flexure—in the course of an operation undertaken for a lesion like an ovarian tumor, a chronically inflamed appendix, a small fibroid, or a ventral hernia—I have no doubt, I say, that the discovery of such a tumor should be followed by immediate extirpation. It is essential, however, in such cases that the facts should be presented to the friends of the patient. If the fact of a much more dangerous operation becoming necessary cannot be presented to the patient's friends, it is always best to wait. Not long ago I found, in some simple operation, the most favorable case of cancer of the sigmoid that I had ever seen. I immediately resected the sigmoid flexure. The patient made a good recovery. Unfortunately, however, there was a recurrence, though the case was so early that we had hoped that the patient might escape it. So, in exploration for gallstones, in a woman of nineteen or twenty, a case already referred to, I found on the pylorus a flattened wart, which I removed by

resection. This patient made a good recovery, and Dr. Whitney pronounced the wart to be a cancer. No one can doubt that this early operation, performed when the disease existed rather as a papilloma than as an infiltrating tumor with ulceration, gave the patient the very best chance for permanent cure. This case is a conspicuous example of the truth of the proposition at the head of this paper. So when one operates for simple appendicitis and finds tuberculosis of the mesenteric lymph glands, the removal of these glands gives the patient the best chance for permanent cure, as has been illustrated now by several of my cases. I have found in an abdominal exploration for some simple thing a calcified tumor of the mesentery, which I removed without question. What effect this tumor had on the patient's health I do not know; it may have had none; on the other hand it may have had great effect, and no one can tell what its future effect might have been. The scope of this paper perhaps does not justify, however, more than an allusion to the duty of the surgeon under these circumstances. If it is generally admitted that tumors should be removed whenever possible, wherever they are situated, then the surgeon's course under these sometimes distressing circumstances is clear.

One of the most favorable illustrations of the necessity for the early extirpation of tumors lies in the pigmented wart. I have seen in a male a tumor filling the lower abdomen for which no adequate explanation could be found, even by the most careful questioning. In this case the tumor was secondary to what was supposed by the patient to be a wart or a corn on the toe. It was a melanotic sarcoma, and it was the source of the abdominal disease. In all such cases of inexplicable abdominal tumors I had made a practice of stripping the patient from head to foot and examining carefully every part of the body. In not a few cases I had found the explanation of these great abdominal masses to be a pigmented tumor in some remote region of the body—a tumor the existence of which had hardly been recognized by the patient. In one instance extensive disease of the axilla was

found to be dependent upon a small pigmented mole over the back. The pigmented sarcoma is, of course, a comparative rare lesion. If one pigmented sarcoma resulted from a thousand pigmented moles or warts, the number of fatal cases would be excessively large, for there are very few people who have not, somewhere upon their bodies, a pigmented mole.

The necessity for removing pelvic tumors in women seems to me great for the simple reason that it is impossible to tell their nature. No matter how experienced and how skilful the physician may be, he cannot eliminate in any case the possibility of malignancy. I have had so many deplorable examples of fibroids of long-standing of this kind that I look upon the exploration of all perceptible pelvic tumors in women as imperative. I do not, however, intend to burden this paper with an enumeration of these cases. A few have come under my observation very recently, and have made the importance of this subject conspicuous.

Miss A. C., aged forty-three years, seamstress, I examined on June 9, 1903. Two weeks before, while walking, she began to have pain in the right side. This was followed by tenderness which seemed to be in the appendix. Seven years before she had been at the Massachusetts General Hospital for appendicitis.

I found a multiple fibroid of the uterus filling the lower abdomen. I could find nothing else. On June 20th I operated. There was a multiple fibroid of the uterus adherent to the appendix, the sigmoid flexure, a right ovarian cyst, and the rectum. The right ovarian tumor, the intestine, and the appendix were joined together in a solid mass suggesting cancer. The tumor was separated from the bowel without injury to it. A cyst containing chocolate-colored fluid was removed, as well as the appendix. There was free serum in the abdominal cavity. The other abdominal organs were normal. This patient made a good recovery. Dr. Whitney reported the tumor to be a multiple fibromyoma.

There were cysts in both ovaries, in one of which was a nodule of disseminated cancer—endothelioma.

During the summer Dr. Hugh Williams removed a cancerous nodule from the abdominal wall. There was a rapid recurrence of the internal disease, and this patient's abdomen is now extensively infiltrated with cancer.

The nature of the tumor in this case was made evident by a thorough examination. The existence of an ovarian tumor was not, however, suspected; and it was naturally difficult, if not impossible, to distinguish between a small ovarian tumor and a lobe of the multiple fibroid. The occurrence of ovarian cysts in connection with uterine fibroids is not uncommon. I have seen many such cases. It is unfortunate in this case that the detection of a uterine fibroid did not lead sooner to an exploration at a time when the removal of the diseased ovary would undoubtedly have been permanently effectual.

Mrs. K. D., aged fifty years, came to see me on October 21, 1902. She was a patient of Dr. Bailey, of Falmouth, who had recently discovered a small tumor in the abdomen. The patient, six months before she came to me, noticed a hard bunch in the lower abdomen, rather on the left than on the right side, low down. There was much pain. The attending physician made a diagnosis of uterine fibroid. For four years the flow had been too abundant. My diagnosis was a movable fibroid about the size of a cocoanut, which seemed to me to have a small pedicle. I had the urine examined by Professor Wood, because slight indications of renal disease were found at the examination at the office. He reported that there was nothing in the urine to contraindicate operation. I therefore advised exploration.

On October 29, 1902, I opened the abdomen. I found an enormously dilated right Fallopian tube, which was removed with great difficulty. At the last moment it broke and filled the pelvis with clear fluid and flocculi. The left ovary was a mass of pearly tissue, which had grown into and through the wall of the sigmoid flexure. I removed

this tumor with the left tube, and an opening was left in the intestine, which was sutured. A small gauze strip was left in the wound. The tumor of the ovary proved to be an adenocarcinoma.

In the summer of 1903 I found an extensive recurrence of the disease. The patient has now a hopeless recurrence.

The diagnosis in this case was apparently clear. The tumor moved freely. There had been abundant hemorrhage and there was every indication of a simple fibroid. Though operation at the time this tumor was first discovered—early in the year 1902—might not have been effectual in removing thoroughly the malignant disease, it certainly would have given the patient a better chance than the operation performed in October. There were no symptoms, even when I first examined her, which demanded immediate operation; and yet the tumor was of the most dangerous kind.

These two cases are vividly in my mind because they are recent ones, and the patients are in the extremity of hopelessness and of suffering. They show the difficulty of making a diagnosis of benignancy—of differentiating between solid tumors of the pelvis. They show that what seems to be simple fibroid of the uterus may be a malignant tumor of the ovary. I could without difficulty multiply these cases. Such cases have occurred frequently enough to convince me that pelvic tumors in women should be investigated in every instance, no matter how benign they may seem to be.

Occasionally—fortunately very rarely—one opens the abdomen expecting to find a tumor, but is astonished to find nothing; or, if he finds in reality a tumor, it is something physiological rather than pathological. Tumors which are supposed to exist, but which do not exist, can be explained only by errors of observation. One must not be surprised, however sure he may be of the presence of an abdominal tumor, to find nothing. This possibility must be borne in mind in considering the universal application of my proposition. When one is perfectly convinced that he feels a new

growth in the abdomen, he will seldom fail to find one when he opens that abdomen. And yet it is surprising to consider how often the surgeon will find that he is mistaken in his tactile sensibilities. In a recent case I felt bimanually in the right side of the pelvis what seemed to be a new-growth. The woman had complained of pain in the right side of the pelvis. I had examined her repeatedly in the course of four weeks. I finally thought that I felt a mass in the region of the right ovary. The patient said that she could bear the pain no longer, and demanded operation. Under full anæsthesia, by bimanual palpation in the lithotomy position, I felt something between my fingers which seemed to me an enlarged ovary, a tube, or some other form of tumor. On opening the abdomen I found nothing but a rather small ovary. It was an error of observation.

Some years ago, in a young woman, I felt a tumor in the region of the sigmoid flexure. I made a diagnosis of either cancer or tuberculosis. The patient was prepared for operation. In the mean time the tumor had disappeared, and she has been well ever since. What I felt was undoubtedly fecal masses.

In another instance I confirmed the diagnosis of a gynecologist in the location of a tumor in the region of the right ovary, supposed to be an extrauterine pregnancy. It was a normal pregnancy. There was no tumor in the region of the right ovary.

It is very seldom however, as I say, that one opens the abdomen and fails to find a tumor which he is sure that he has felt. Cases like the last are excessively infrequent. Examples of this kind are taken from my records, which include several thousand abdominal operations. The only way to avoid these unnecessary explorations is to examine the patients several times at intervals of a few days or of a week, and, finally, to examine under full anæsthesia.

In a recent case—that of a man—I felt a tumor of the sigmoid flexure, and made a diagnosis of cancer with obstruction. Not long afterward the attending physician reported

that the tumor had disappeared. It had, in fact, largely disappeared, but I could still feel a tumor. The diagnosis was cancer of the sigmoid flexure; but intermittent chills and fevers, with sudden discharge of what was described to be pus, led me to think the lesion possibly appendicitis, with abscess on the left side—not a very uncommon form of appendicitis. Exploration showed the tumor to be an infiltrating carcinoma. My first opinion was correct.

The fear of unnecessary exploration, stimulated by the occasional failure to find a supposed tumor, leads one perhaps to go too far toward conservatism. By repeated examinations, and by always making combined vaginal and abdominal or combined rectal and abdominal examinations under full anæsthesia, one will seldom make an unnecessary exploration. Occasionally it will happen that a tumor is felt distinctly at one time and not at all at another. A tumor that can be felt at one time and not at another may be fecal. It may be the temporary dilatation above a stricture. In the case of the gall-bladder it may be a temporary distention of the gall-bladder. In the case of the pylorus, it may be a pylorus at one time within reach, at another time inaccessible. In the case of the tube, it may be at one time a distended tube, at another an empty tube; it may be at one time a tense, thin-walled cyst, at another time a ruptured, empty cyst. All these possibilities must be borne in mind in considering the applicability of a universal rule. The rupture of an ovarian cyst, the disappearance of a tumor, has at times deceived me. On one or two occasions I have felt a distinct tumor break and disappear under bimanual examination, the fact being demonstrated by immediate laparotomy. It requires faith in our opinions to open the abdomen after the sudden subsidence of a tumor. I have found, however, in not a few instances the abdomen filled with the contents of a ruptured cyst, the flaccid cyst wall being impossible of detection, and the amount of fluid being too small for demonstration. Sometimes a tumor will suddenly appear where none had been discovered before.

A suddenly appearing abdominal tumor is usually an ovarian tumor with twisted pedicle—a hemorrhage into a cyst, the hemorrhage of extrauterine pregnancy, the sudden twisting of a large sigmoid flexure.

Could the removal of tumors of the ovary and of the uterus be accomplished with as little danger to life as the removal of tumors of the breast, and with as little interference with the general make-up, the rule of removing all tumors would certainly apply. In spite of the dangers of the operation and the profound influence upon the whole economy, tumors of the ovary should in every case be removed as soon as they are discovered for reasons already stated. For the simple reason that ovarian tumors never disappear, they must be removed at some time. Moreover, they are—more than any other tumors in the body—treacherous, even when they seem most harmless and insignificant.

In tumors of the uterus which do not present at the cervix, which are connected with the uterine body, and therefore not open to examination, the question of universal extirpation is a far more difficult one. The vast majority of uterine tumors are fibroids. Fibromata—however justifiable operations for their removal may seem when they are located in the breast, in the scalp, in the neck, in the skin, in any easily accessible place—can be removed from the uterus only by abdominal or by vaginal section. This in itself is an operation of danger—of slight danger in skilful hands it is true, but nevertheless of danger. The excuse of threatening malignancy, always present in ovarian tumors, does not, as a rule, exist in uterine tumors. Fibroids so rarely become malignant that the possibility need hardly be considered. They do no harm except by their weight, or by pressure upon other organs, unless they cause pain and hemorrhage. Pain and hemorrhage, when present, justify the rule. When the tumors are too small for pressure, and when they cause no pain and no hemorrhage, they should be exceptions to the rule, unless they are rapidly growing, and unless, therefore, it is evident that they must at some time be removed.

The exception to the rule in the fibroid, then, is the small, non-compressing, non-bleeding, non-painful, and slowly growing tumor. All others should conform to the rule.

And yet who is to say that the tumor in question is in reality a fibroid? Who is to suffer if a supposed fibroid is an ovarian cancer or cancer of the uterine body? The past six months has shown me three cases of uterine adenocarcinoma treated as simple and harmless fibroid to the very limit of possible extirpation.

Another reason for the removal of small fibroids is in their situation, with small outgrowths of the uterus in close relation with the ureters. Fibroids sometimes exist in the layers of the broad ligament; and if they do not immediately interfere with the ureter, they may later do serious harm. Tumors situated in this region are hard to differentiate from the malignant tumors. The possibility of overlooking a malignant growth adds materially to the indications for operation.

In tumors that are with difficulty accessible, and that are hard to remove, the question as to the advisability of operation must depend upon the skill and experience of the operator. All such tumors should be left untouched except by operators of the largest experience and the highest skill.

Errors in Diagnosis.—Everyone is liable to mistake a malignant tumor for a benign one. Though I have been able to illustrate the statements made in this paper by cases of my own, errors in diagnosis and in prognosis are inseparable from the experience of everyone. Mistakes can be found in the practice of even the most skilful, the most experienced. The more inaccessible the tumor, the more the diagnosis must depend upon the history. A correct interpretation of histories requires not only enormous experience in weighing symptoms, but an inborn talent in making deductions; and, finally, it requires an intuition which cannot be cultivated, explained, or taught. Very few of us possess these qualities, both congenital and acquired, which make the successful diagnostician. Moreover, however skilful we

may be, most diagnoses of inaccessible tumors are open to doubt. Accessible but deep tumors—*e. g.*, of the kidney, the stomach, the pancreas, of the pelvic viscera—permit less doubt, it is true, but always considerable. External tumors, or tumors which can be palpated thoroughly, though they permit the least of all, may suggest some uncertainty.

It is this doubt, inevitable in most cases, which requires the use of a general rule like that embodied in the title of this paper.

The arguments in favor of the universal extirpation of tumors, whenever possible, may be summed up as follows:

1. The impossibility of telling exactly the nature of the growth until the whole tumor has been removed.
2. The liability of a benign tumor becoming malignant.
3. The liability that an operable tumor—even if non-malignant—may become inoperable by extension.
4. The chance that the patient's general condition, at first favorable for operation, may by delay become unfavorable.

The arguments against the proposition are:

1. The tumor is benign, and likely to remain so.
2. There is some risk in the operation itself and in the anæsthetic.
3. The patient's general condition may forbid operation, making surgical intervention more dangerous than the tumor, the remedy worse than the disease.
4. The after-results of removal—by disfigurement, hernias, and other disabilities—may be more serious than the disease left to itself.

Conclusions.

All neoplasms should be removed.

Exceptions. Most of the exceptions are clear and indisputable. They are as follows (it is assumed here that the tumors under consideration are correctly diagnosticated):

1. Benign tumors doing no harm, either by their appearance or by their presence, and having no tendency to become malignant.

2. Keloids.

Inasmuch as scar tissue cannot be removed without making a scar, it would seem inadvisable to remove keloids unless they interfere with comfort or have already become degenerated into malignancy. Excision is justifiable in large, disfiguring keloids and disabling keloids, in spite of the tendency to recur, for the recurrence will be slow enough to give several years of immunity.

3. Other benign tumors not causing pain, disfigurement, or disability, whenever removal is dangerous or conditions unfavorable.

4. Whenever the dangers and sufferings of removal, on the whole, outweigh the dangers and sufferings of the tumor itself.

DISCUSSION.

Dr. Henry T. Byford, of Chicago.—With regard to removing tumors as soon as we see them, I belong to the Chicago Academy of Medicine, whose motto is, "When you see a head, hit it." I think that is what we should apply to tumors. If you discover a tumor and operate, there will usually be no harm done. Whether we are dealing with malignant tumors or not, the same principle, in my judgment, holds true. We not infrequently run across the problem of a fibroid tumor which is supposed to have stopped growing. We now know they do not usually stop growing, and time will prove that fibroid tumors, as well as other non-malignant growths, are due to a constant source of irritation. That irritation must be due to some form of germ life that is not transitory, but keeps on working.

Dr. W. P. Nicolson, of Atlanta.—I will speak of one point in connection with this paper, and that is, we may sometimes come across a tumor that is inoperable, or a hopeless growth. I have seen two cases. One was a man who had a large cyst situated low down in the abdomen. He had all the typical appearances of a cancerous cachexia. I concluded to make an exploratory operation. I did so, and found a large cyst which ruptured as we were handling it, which was filled with a coffee-colored fluid. I did not stop where I was. I tore out pieces of sarcoma as large as my fist, which were friable, and attended with considerable

hemorrhage. Finally, I reached a point where I could with a reasonably easy conscience leave it and tie it off the best I could. Just as we were concluding, I saw something, picked it up, and found it sprang from the mesentery. I had torn the intestine in two and had removed it. After a diligent search we got the two ends of the intestine together and joined them with a Murphy button. I closed the abdomen without drainage. The patient was pulseless for twenty minutes and was supposed to be dying. I telephoned to the hospital and asked how long the patient would probably live, and I received information that he had reacted nicely and had then a pulse of 100. The microscope demonstrated the tumor to be a sarcoma of rapid growth, and it was absolutely typical. The man to-day (five years after the operation) weighs more than he ever did in his life, and is in perfect health.

I saw another case upon which I operated for a surgeon in this room at Fort McPherson. The man had a tumor springing from the pelvis, and upon opening the abdomen it seemed to spring back of the rectus muscle, and infiltrated the whole pelvis. By most diligent work I got in this case where I could stop, leaving a great deal of the tissues in the pelvis, which would not become infected. This specimen was examined at the Army Medical Museum, Washington, and pronounced sarcoma. The Directors report that he was discharged from the army a year afterward in good health, and as far as I have been able to trace him, he is at present enjoying good health.

These are two cases of sarcoma where breaking up and handling of the growths seemed to cause the tumor to disappear. Dr. Coley tells me that this is something in his experience that he has heard of, but never seen. Whether it has been the experience of any other surgeon I do not know. The diagnosis was confirmed in both cases, and the tumor had the typical appearance of sarcoma. The first case had no abdominal trouble whatever. He passed the Murphy button on the fourteenth day.

As far as early operation is concerned, I believe the experience of almost all of us, in looking back, is that we will find something that will afterward destroy the life of the patient, or at least put it in jeopardy. Early operation, when safe, is certainly to be commended and recommended in every case.

Dr. W. B. Coley, of New York City.—I think Dr. Richardson's paper is an exceedingly timely one, and I am more and more impressed every year with the very large number of not only medical men, but men who do more or less surgery in the smaller towns, who take the attitude which Dr. Richardson has condemned in regard to the early removal of these tumors. Recently a practitioner having a large practice in New England advised a patient not to bother with a tumor until it bothered her.

Three years ago I had a patient come to me with an extensive cancer of the breast. She had been under the observation of a

New York surgeon, of great eminence, who had been watching this tumor for a year, and he told her not to have anything done until he thought it needed it. Finally, she came to see him once every two or three months, and the last time he told her that she undoubtedly had a cancer. The following week she came to me for operation. At this time the glands were markedly enlarged, the skin adherent, and the tumor had all the characteristics of advanced cancer. Even after a thorough removal was made the disease returned within one year, and ended fatally. That is only one example of many others.

As to the advisability of exploratory operations, which have been advocated, by means of either an incision or punch, there is very strong reason to believe that when a large punch or incision is made in a highly vascular tumor, the cells are carried through the circulation and cause general metastasis at no distant day. I think we ought to remove these growths without waiting to determine whether they are malignant or not.

With reference to the use of the *x*-ray, I should like to emphasize what Dr. Richardson has said. Only recently I operated upon a man for cancer which involved the entire lower lip, requiring an extensive plastic operation, with very little hope of saving his life. He was treated a year ago with the *x*-ray for a small epithelioma of the lip. It disappeared promptly under the *x*-ray treatment. After thirteen treatments the man went home apparently cured. In less than six weeks the disease returned. He received continuous *x*-ray treatment until this fall, and when he came to me he had the condition I have described. Such cases of cancer are occurring all the time. Practitioners are misled by the flattering early reports of *x*-ray treatment of cancer, consequently they treat these cases until it is too late to cure them by operation. I have seen a great many such cases. We have had in the Memorial Hospital, New York, something over one hundred cases treated by the *x*-ray, in many of which there were small recurrent nodules, and yet after these had seemingly disappeared I have seen the disease attack the ribs and the sternum, and the patients get general metastasis while undergoing treatment for the small nodules. While there is something in the *x*-ray, and that it does have an effect on superficial growths we must admit, yet in all of our cases, with one exception, both sarcoma and carcinoma, the disease has recurred, many of them showing general metastasis, which goes to show that the *x*-ray itself, especially in vascular tumors, with rapid breaking down, may increase the tendency to general dissemination of the disease.

Regarding late operations and operating on hopeless cases, I recall a case of cancer of the floor of the mouth I operated upon seven years ago. It recurred in six weeks, and the patient returned for further operation, and I made one more attempt. I

did a preliminary tracheotomy, made a V-shaped incision, took out the glands of the neck, and ten days later reopened the wound, took out the floor of the mouth and tongue. The man is perfectly well to-day.

Dr. W. P. Carr, of Washington, D. C.—One of the first tumors I ever removed was a cancer of the breast in a young girl nineteen years of age. It was a small tumor. I had no idea it was cancer. I made some sections of it afterward and found it to be typical carcinoma. This prompted me to examine all of the tumors that I removed thereafter, particularly tumors of the breast, and I was much surprised to find that a great many of the small tumors which I thought were simple adenomas proved to be carcinoma. If we will all make it a routine practice to examine all of the small apparently benign tumors we remove, I think we will find that a great many of them are malignant.

I want to add my testimony to the fact that a great many mistakes occur in diagnosis, where really benign tumors are mistaken for hopelessly malignant ones. I have seen in the last year two or three cases. One case occurred in a man that I thought certainly had carcinoma of the pancreas. The tumor was large; I was assisting Dr. Jackson, who, after getting into it and removing a specimen, closed the abdomen on my advice. He sent the specimen to a good microscopist, who pronounced it carcinoma, but as a matter of curiosity sent a specimen also to Dr. Reed, of the Army Medical Museum, and it was sent to Dr. Flexner, who pronounced it to be a tumor of fat-necrosis. The man recovered perfectly and is well to-day, with no sign of tumor.

I have seen another case which was diagnosed as carcinoma of the rectum by a number of good surgeons in New York and Baltimore, and several refused to operate because it was considered a hopeless case. The patient finally went to Dr. Kelsey, of New York, who split it open to relieve the constriction causing it, and it disappeared. The man is well to-day. There is no doubt but that the best diagnosticians make mistakes, taking small malignant tumors for benign ones in the early stages, and benign growths for malignant ones.

Dr. J. M. Baldy, of Philadelphia.—I admire Dr. Richardson's modesty in confessing his inability to diagnose a great many cases. I do not flatter myself that I am very old, but the older I get the more I am convinced that the really honest man admits he recognizes a great many cases of tumors that he cannot diagnose accurately. That cancers of all characters are apt to develop in many tumors which may exist in the body is well known, and one can recall cases of tumors that have become cancerous long after they have passed out of his hands. For instance, speaking of fibroid tumors, a man will say that a fibroid tumor is an innocent growth. He recommends that it be left alone and when the cancer comes remove it. It is well known, for instance, that cancer will

not develop in a pure fibroid. We also know that cancer can develop in such a way as to invade a pure fibroid, which amounts to practically the same thing. Technically, there may be no such thing as cancer in a fibroid. We have cancer of the endometrium, which does or does not invade a fibroid tumor underlying it. Whether you call it cancer of a fibroma or not, the result is the same to the patient. A certain proportion of them become malignant, and the patients die. The adenomyomas, although rare, may especially become cancerous. I think Dr. Richardson's position is correct, that all neoplasms should be removed, it makes no difference where they occur.

It is easy to *x*-ray these tumors. I removed in the last year half a dozen tumors of the breast, all of them malignant; but there are undoubtedly a number of breast tumors that are benign. There are a certain number of these tumors we could remove that are not malignant, but we should as a rule consider that the vast majority of them are malignant, and that the patients will die from a return of the disease if they are not removed. I have in the past year reoperated twice on cancers that were subjected to the *x*-ray during the course of the treatment. In one case I operated a third time for the return of the disease, yet the *x*-ray man was telling me all the time that the patient was progressing satisfactorily.

The man who will subject cases of cancer of the breast to the *x*-ray without removal of the breast, or who will not reoperate at the first indication of recurrence of a nodule at the seat of the operation, is at perfect liberty to do it, but I want nothing to do with his judgment. We can safely say that the vast majority of breast tumors are cancerous or will become so. It is not so extreme in the pelvic cases. In a large number of pelvic cases we will find a fibroid tumor or ovarian cyst. If we find one or two complications in plain, simple cases when we operate, how many chances are we going to take in running across cases that are incurable if we delay the removal of the neoplasm? A few cases come to grief from bad surgery and from inaccurate diagnosis, which Dr. Richardson has excluded in his paper. But when we consider the perfection of diagnosis (I do not mean perfection in its literal sense, but perfection in a professional way which the ordinary man of experience can reach), it seems to me it goes without saying that the time is coming when neoplasms of all kinds, even lipomas, ought to be removed. We can do little or no harm by attacking these neoplasms; but we can do an enormous amount of harm by hesitating or not removing them. I am not only in sympathy with what has been said with regard to the removal of neoplasms invading the abdominal and pelvic cavities, but all over the body.

Dr. O. L. Shivers, of Marion, Ala.—I would like to ask for information in regard to an angioma developing at the site

of a birth-mark. Is it malignant as long as it does not become fixed or adherent to the muscular tissue below?

Dr. Richardson.—I would not base a diagnosis on any one thing, either infiltration or adherence.

Dr. J. Shelton Horsley, of Richmond, Va.—I wish to report a case briefly which I saw by the courtesy of Dr. E. G. Williams. The patient had been operated on some time previously—I do not know just how long—for cancer of the breast. There was a local recurrence, and she had been treated by the *x*-ray. After two weeks' treatment she began to sink rapidly and died. There was a small burn produced by the *x*-ray. A post-mortem examination was made, at which I was present, which revealed the most extensive case of metastasis I have ever seen. There were metastases not only in the lungs, liver, kidneys and ovaries, but in the heart. I believe that is quite unusual. I mention this case to show that the *x*-ray did not prevent or even lessen the extensive metastases.

Dr. Richardson (closing).—I have nothing further to say, except that I have been much interested and pleased with the discussion.

APPENDICITIS.

By George R. Dean, M.D.,
Spartanburg, S. C.

It is scarcely possible to write a paper on this subject for an Association composed of the leading surgeons of our country that will contain anything not already written and taught, and, as there are other papers on this subject to be read here, it will be difficult to give this paper individuality worthy of this audience. It is not to enlighten or instruct this Association that I offer these few thoughts gleaned from a limited experience, but through it and the other papers to be read here, together with the discussions which I hope may follow, to send out from this Association its approval or disapproval of the propositions herein set forth. There are to-day, strange to say, surgeons, specialists, and physicians, who, after all that has been written and said upon this worn-out but still living subject, advocate the Fabian plan of do nothing or waiting developments, and these men who thus ignore all that has been shown by the result of surgical interference and still wait for symptoms have a large following; and in this train of credulous believers there are thousands of good men and women dying annually in this country from this dreadful disease. It is a singular fact that among the laity a doctor is a doctor, and one is usually considered as good as another for any disease, and when a family physician is called into a case of this nature and the question is asked: "Doctor, what is it; is it appendicitis?" the usual answer would be about as follows: "Well, perhaps it is, but it may be something else; you need have no fear; if appendicitis, it is a very mild case and there is no danger." Thus, to-day,

to-morrow, and to-morrow again passes, and finally another doctor, with similar views to the first one, is called in, and concurs exactly in what his friend has done, and encourages the patient to look for a safe and speedy recovery. Thus time passes, and the patient grows worse. Finally, in sheer desperation, the surgeon is called in. What does he find? Often a hopeless case. Still, daring to do his whole duty, he will operate, and often the neglected patient dies. These doctors then say: "Well, we never did have any faith in operations," and the neighbors more or less accept their dictum. "Have these doctors not lived here all their lives and done all of our practice for years, and are they not as efficient as any doctors in the country?" Thus they are commended instead of the surgeon, and still they are responsible for the death. Yet those who are responsible are congratulated for their opinion. Now, this is only one of the many cases I have seen, but not lately, for I have preached and practised operation so much with the usual result in early operations, that if a patient has pain in his abdomen in my neighborhood, he wants to see a doctor who operates, and see him at once. It is to teach this early interference first, in all cases of appendicitis, that this paper is written. The appendix has been tersely named by one of the Fellows of this Association an "assassin"; no better name could be given to it. Lying in wait for its victim, although the first attack may not be effectual, the patient, under castor oil, high enemata, massage, turpentine stupes, rest, starvation, or saline cathartics, soon recovers, much to the gratification of the patient and much credit to the misnamed "conservative doctor." This is only a respite that is given to quiet the fears of the patient, to give him an opportunity to flee from the danger awaiting him by an operation in the interval before another attack. Unless in the hands of an intelligent surgeon, he never accepts the latter plan. Another attack, another cure, and perhaps others, but the last one comes eventually, and the patient succumbs to the "assassin" at last. This ought never to be the case. If we practise and teach operation on the approach of the first symptoms, keep-

ing it up, in and out of season, practising it as well as preaching it, the time will come when there will be no unbelievers, and many valuable lives, now sacrificed yearly to false conservatism, may be saved. There is only one thing for surgeons to consider in appendicitis, and that is, to be sure that he has appendicitis with which to deal. It is not the purpose of this paper to go into a diagnosis of appendicitis. There are works upon this subject innumerable, where all symptoms of the various approaches of this dreadful disease can be studied carefully, and I cannot consume the time here to describe them. Many cases will require careful examination. This is where the surgeon of experience has advantage over his less favored brother, whose scope of work is limited. He can do the mechanical work as well as his more experienced brother, but he has not that vast store of experience to draw from that he who does operations almost hourly has at his command, and yet there are signboards in all cases that point to the cause, if only we read them correctly.

Often by a patient's description a case can be diagnosed without examination. There are some cases that an intelligent physician will diagnosticate thus correctly, who has never seen a case operated upon. There is one symptom that is practically always present in all cases. Somewhere in the region of McBurney's point, below, above, to the right or to the left, there will be a point of tenderness. I have found that point underneath the point of the ribs on the right side. I have found it on a level and behind the crest of the ilium. I have found it to the left of the umbilicus. I have found it in the pelvis. Of course, in all cases of this nature, the history of the case goes far to eliminate doubt. The surgeon having decided he has a case of appendicitis, should openly, earnestly, and frankly inform his patient and the family the nature of his trouble and then advise operation. There should be no waiting for developments, no waiting for severe symptoms, no waiting for better opportunities, but always, as soon as the case can be diagnosed, just so soon should operation be

advised. The condition of the patient and environment, of course, have their weight in determining the exact time for an operation. But these do not vary the principle that I wish to lay down, and that principle is, that as soon as a case of appendicitis has been diagnosticated, operation should be advised. There are very few cases nowadays where, if an intelligent surgeon approaches a patient in a fair, open, frank, and earnest manner, but what his opinion will be accepted. The saddest case I ever witnessed was an exception to this rule. A lady from Boston, a most estimable and lovable woman, laughed at my earnestness on Thursday, and utterly refused operation because she had had repeated attacks of neuralgia of the ovaries, as she persistently called it, as diagnosed by her family physician. On Saturday following, I was called to operate; when I saw her the brightness in her eye and the flush on her cheek but too plainly told the story of the mischief that had set in and would end only with her death; she died within forty-eight hours after the operation, of sepsis. A far different example in a gentleman whose office I visited at 11 o'clock in the morning, examined him on his writing-desk, sent him home, and at 3 o'clock his appendix was removed, and he is to-day living and well. These were two extremes, and they fully exemplify the waiting and non-waiting operations. As to the mode of operation, the scope of this paper will not permit me to dilate. The choice of location for incision, its direction, should be left to the nature of the case largely, each surgeon selecting his own method of entering the abdomen. But there are some general principles that, to a certain extent, in my opinion, should govern all operations. The smallest incision through which it is practical to do quick and perfect work should always be chosen. The high button-hole operation in the hands of experienced surgeons, who can differentiate the class of cases suitable for such, are advisable with this class of surgeons; but to the ordinary operator, who has not the vast experience of hospital practice, I would recommend the operations as near as possible over the site of the diseased appendix. In dealing

with the appendix itself, I prefer its deep amputation, practically excising it out of the bowel and repairing the rent thus made with Lembert sutures, leaving the bowel in such a condition as, after healing, scarcely to discover where the appendix grew. The technique, the toilet, sutures, etc., I will not discuss. I simply wish to give, in my feeble way, my opinion and belief that always in every case, under all conditions, where possible, we should urge operation where appendicitis has been diagnosed. Out of 100 cases of appendicitis, 100 being operated on in the beginning of an attack, where the surgery has been performed under proper aseptic rules, 100 will get well. Out of 100 cases of appendicitis where operations are not done, possibly 75 or 80 will get well; possibly 20 or 25 will die. I said 75 or 80 possibly would get well; I mean by that, that 75 or 80 would recover from that attack. In those 75 or 80 there will be a large percentage that will have recurrent attacks, and a large percentage recovering from the first attack will remain more or less crippled if they never have another attack. Reasoning, therefore, from this point of view, if all get well from a simple, slight operation, that does not impair the usefulness of the patient in after life, and, on the other hand, 15 per cent. or 20 per cent. will die without operation, and a large percentage of those who do not die are cripples more or less for life, what is there for those to stand upon who oppose early operation under all conditions? To say that a surgeon will wait for development of symptoms that will point to necessity for operation simply means, in a large number of cases, the death of the patient. For there is not a surgeon living to-day, nor will there be to-morrow, who can tell in any given number of cases, in the beginning of the first attack, which ones will have severe attacks and which ones will have light ones; which ones will die without operation; which ones will recover permanently; which ones will recover to have repeated attacks; or which ones will recover disabled, though never have another attack. This brings us back to our original proposition, that the surgeon should be called in all cases of appendicitis. It is a

surgical disease, outside of the pale of the physician, outside of his legitimate field of operation, and when a surgeon has once discovered that he has a case of appendicitis, there is only one proposition for him to make, and that is to urge operation at the earliest possible moment.

APPENDICITIS.

Its Relation to Pelvic Inflammations.

By J. M. Baldy, M.D.,
Philadelphia, Pa.

There seems to be a considerable deal of difficulty among surgeons in regard to the status of this subject. Much is written concerning it by men who appear to have a good conception of the underlying conditions, much by men who seem to have a very confused idea, and a great deal by men who apparently have not the faintest idea of that about which they are writing, and whose conclusions are consequently worthless. The subject is complicated in some of its aspects and becomes the more confused, as there is a lack of common understanding as to the definite meaning of terms used in the discussion. There is, of course, but one basis on which to consider the relation of these two diseases—the pathologic. I use the expression "two diseases" advisedly, as, in spite of all that has been written, I am firmly of the opinion that they are absolutely independent conditions and in no way (except in certain peculiar rare circumstances) related one to the other, either in cause or effect. Both pelvic inflammatory disease and appendicitis are infectious in origin. In the case of pelvic inflammatory disease the source of this infection is from the uterus; in the case of appendicitis it is from the interior of the vermiform appendix or the intestine.

I do not mean to deny that pelvic inflammatory disease may occur from traumatisms, nor that an appendicitis may

arise from the same cause; but this is true so rarely that I wish to be understood as excluding such from present consideration, in order that we may have a definite and common understanding as to the terms "pelvic inflammatory disease" and "appendicitis" as applied to the relation of these conditions. Otherwise there will be as much confusion in understanding as has occurred in the past. It is definitely understood, then, that in the use of these terms an infective origin is understood.

It is not an uncommon experience for operators to find on opening the abdomen that both the vermiform appendix and the pelvic organs are bound up in a common mass, and this condition is by no means dependent on an advanced degree of inflammatory process. I have myself seen over a hundred such cases. For this reason many surgeons find great difficulty in making a diagnosis between these diseases, and both worry themselves and endanger their patients by unnecessary delays in trying to be too refined. The comparatively exact methods of diagnosis of the day are such as to render any extended remarks on this part of the subject superfluous. The diagnosis is fairly easy in the majority of cases, and where any serious doubt obtains it rarely fails eventually to be settled in favor of the pelvic inflammatory disease. The fact of the doubt existing in the mind of a skilled diagnostician is a strong element pointing to the pelvic origin. After the abdomen has been opened I have yet to see the first case in which a doubt remained in my mind as to which organ was the cause of the inflammation. If, then, one has a reasonable cause for doubt, the incision should be made as for pelvic disease, because the chances are largely in favor of this trouble; and if by chance it turns out that an appendicitis exists, and that the pelvic inflammation is merely secondary, it is because the colon and vermiform appendix are so low as to practically be lying in the pelvis, and can readily be dealt with through the median incision.

Kelly has canvassed the methods of practice of some fifty

or sixty of the surgeons of the country in the treatment of the vermiform appendix when the abdomen has been opened for any cause whatever. Some fifteen or twenty of these gentlemen remove this organ as a routine in the practice of abdominal surgery ; a very large proportion of them remove it always if it is adherent, Kelly himself being among this number. A few remove it only if it is otherwise diseased. The reason given by most writers for removing it if it be adherent is that its vitality is lowered and that appendicitis is very liable to follow, or that it is already the seat of appendicitis ; in fact, the assumption is that in large numbers of these cases the disease is originally an appendicitis and that the pelvic inflammation is secondary.

I am able to appreciate the reasons (although not agreeing with them) of the class of surgeons who remove the vermiform appendix as a routine practice as a prophylactic measure, but am unable to follow the reasoning of that class who adopt the practice of removal on the ground that the condition of adhesion implies appendicitis or future danger of this disease. In the first place, 90 to 95 per cent. of this mixed class are in origin cases of pelvic inflammatory disease, and the adhesion of the vermiform appendix is a mere coincidence due to inflammation of contiguous serous surfaces, as is so commonly the case of adhesion of intestines in pelvic inflammatory diseases. Whoever thinks of confusing these adherent knuckles of intestine (to a pus tube or a salpingitis) with infective disease of the intestines ? And how can the mere denuding of the peritoneal coat (and often only the surface portions of it) of the vermiform appendix predispose it to a future appendicitis or originate an infective process in its mucous membrane lined cavity ? Anyone at all familiar with intra-abdominal processes surely is aware of the fact that at the end of a week or two one of two things has occurred to such a vermiform appendix : the serous membrane is fully re-formed, or the organ, at the worst, is bound down or covered over by a film of serous adhesion. The formation of the latter condition is well

known to be a favorite way of nature to cure certain mild cases of real appendicitis. Call the conditions what you will, a vermiform appendix so involved emphatically is not appendicitis, and its removal cannot, therefore, be justified on this plea. Its removal for the other causes noted is unnecessary in the vast majority of cases, is adding always a certain element of danger to the operation, and not infrequently is so dangerous as to be absolutely unjustifiable.

The justification of taking the additional risk of infection and loss of time is, of course, closely bound up in the future behavior of these cases, and one must in the long run be governed by experience. Personally, in over one hundred such cases I have not found sufficient cause to make me remove the vermiform appendix more than once; and this in spite of the fact that in not a few of them inflammatory products had invaded the underlying coats of the peritoneum. In no such case have I ever had to re-operate on account of the condition of the vermiform appendix; in none have I found symptoms remaining referable to that organ; and in no case, where for any cause I have had occasion to again enter that individual abdomen, have I failed to find the local repair satisfactory (although I admit such opportunity of proof has been rare). In no case have I known appendicitis to occur subsequently in an appendix I have so treated. I do not wish to convey the impression that an appendicitis could not occur under these conditions as well as under normal conditions, because I can see no reason why it should not. I merely record the fact that it has not done so, and only for the purpose of supporting my position when I assume that this class of injury does not predispose to a future attack of appendicitis. My experience has led me to differ also with those gentlemen who hold that appendicitis generates pelvic inflammatory disease or that pelvic inflammatory disease generates appendicitis. The two diseases are rarely associated, and only then as a coincidence. I am firmly of the opinion that the one never causes the other. The association we so fre-

quently see is the one disease involving the other organ by the spread of inflammation by contiguity, which spread of inflammation does not carry with it the elements of the original infection. And when the one organ or the other is so involved (simply by reason of anatomical relations) the disease can in no sense be called appendicitis on the one hand, nor pelvic inflammatory disease on the other, and in neither cases is there sufficient reason in the vast majority of cases for so treating it. The mere deposit, as shown by the microscope, of a few inflammatory products in the walls of the vermiform appendix or in the walls of the Fallopian tubes or broad ligaments does not make appendicitis in the one case, nor does it make pelvic inflammatory disease in the other case ; call it what else you will.

I would record this one other fact as substantiating the position of the one disease not being a causative factor for the development of the other.

In all my experience I have not seen a single case in which having found pus in a Fallopian tube have I found pus in the involved vermiform appendix ; nor have I found a perforated or gangrenous appendix in such a case. And, on the other hand, where, having found a perforated or gangrenous vermiform appendix, or one which contained pus, either in its cavity or enclosed in its walls, have I ever noticed pus in a Fallopian tube or ovary. Should I meet with such a condition it would appear to me (so rare must it be) that the two diseases existed as a coincidence independent of each other as far as direct infection from one to the other was concerned. If such was not the case the complications would certainly be of frequent occurrence, much more frequently than is even claimed by the advocates of this theory, because it is so exceedingly common to find this association, even to the extent of the contiguous formation of pus. I have not infrequently seen the pelvis full of pus in the case of appendicitis, and have just as frequently seen the vermiform appendix form part of the walls of a pelvic abscess due to pelvic inflammatory disease.

RETROPERITONEAL INFECTION A RESULT OF APPENDICITIS.

By I. S. Stone, M.D.,
Washington, D.C.

The controversy between the advocates of the intraperitoneal and extraperitoneal origin of perityphlitis, or suppuration near the cæcum, which raged for a time, diminished in violence only to be renewed when Sir Frederick Treves operated upon King Edward. The disputants were alike mistaken, for each declared his position the only correct one. The "intras" said all the trouble came from appendical rupture into the peritoneal cavity, while the "extras" with equal vigor asserted that appendicitis was a nightmare, and that it was all "para" or "peri" typhlitis.

It is beyond question, however, that the older pathologists and surgeons knew what was meant by retroperitoneal infection, and we find that in 1834 Dr. James Copland, in his *Dictionary of Medicine*, clearly discriminated between inflammation of the cæcum, the vermiform appendix, and the pericæcal tissue[1] (quoted by Fitz).

A little before this date, Goldbeck[2] wrote a thesis upon perityphlitis,* and Dance and Husson,[3] inspired by Dupuytren,[4] wrote an account of the suppurative diseases about the cæcum.†

* It is claimed by Willard Parker that a German named Purchett was the first to use the word perityphlitis. Virchow was the first to suggest the name paratyphlitis.

† It is said by Vladoff that Mestiver, in 1759, was the first to describe the suppurative diseases of the appendix and cæcum, and that Albers, of Bonn, first used the name typhlitis.

In 1836 Addison,[5] of London, published a work on typhlitis, and also lectured upon this subject prior to that date. Melier[5] and Burne,[6] in 1837, Hancock, 1848, and Willard Parker,[7] 1867 (see reference, W. Parker), were pioneers in the study of the subject at the operating-table and in the dead-house.

Samuel Wilks,[8] of London, in 1859, wrote upon the various inflammations around the cæcum, and demonstrated their origin in both the appendix and cæcum. It is only fair to observe that the earlier writers failed to understand the real nature of "typhlitis," and it is perhaps true that Burne was among the first, if not the first, to discover a relation between appendical disease (rupture?) and the resulting abscess in the right side, "typhlitis" or "peri-typhlitis."

A little later Dr. James H. Pooley,[9] of New York, reported 46 cases of retroperitoneal abscess; all of the patients recovered after operation save 5. Of these 5 fatal cases, "3 patients had peritonitis, 1 had abscess of the lung, and 1 died of asthenia."

Since the work of these men we have a better idea of the role of infection, as we have also a better knowledge of surgical anatomy and of how the morbid process extends from the bowel by way of the appendix, not to the peritoneum alone, but under certain circumstances to the connective tissue, lymphatics, and vessels outside of that membrane.

Frequency. In 100 observations Wier[10] found 85 cases of peritonitis, 5 of extraperitoneal suppuration, and 9 with both (mixed) intraperitoneal and extraperitoneal suppurations, 14.9 per cent. of extraperitoneal infection, and 4.6 per cent. without associated peritonitis.

Maurin, quoted by Fowler,[11] found in 94 fatal cases 5 extraperitoneal and 9 mixed or intraperitoneal and extraperitoneal infections. There were 4.6 per cent. of purely extraperitoneal infections and resulting suppurations, without peritonitis.

Fergusen[12] says that in 77 of 200 cases in 35 per cent. "the appendix was so placed and covered by peritoneum that its perforation would have opened into subperitoneal tissue, and a diffuse cellulitis would have resulted."

Hawkins,[13] who has written a most admirable work upon the diseases of the appendix, assumes that the appendix is always intraperitoneal,* yet says: "Iliac abscess may form as a result of perforation of an appendix already adherent on the posterior peritoneal surface." (Hawkins, op. cit., p. 92.)

R. H. Fitz[14] found 11 posterior infections in 257 cases of appendicitis.

J. B. Deaver[15] found 174 cases of posterior infection in 413 patients treated in one year (1901). Of these, 41 cases were retrocæcal.

Langhelt, of Berlin, in 112 autopsies (*vide* Loison[16]) found 4 cases of thrombophlebitis, 2 hepatic abscesses, 2 of hepatitis, and 2 of perihepatitis.

Einhorn (*vide* Loison), of Munich, found in 100 autopsies 6 cases of infectious embolism of vena porta and liver abscess.

G. R. Fowler (op. cit.) appears to confirm the opinion of Fergusen and others that in a large proportion of cases the appendix is not entirely within the peritoneal cavity, or, in other words, it is not entirely enveloped by that membrane, and "the uncovered portion is in direct contact with the subperitoneal connective tissue."

Beside the authorities above named, a large number of writers have not only recorded their observations, but have, in addition, reported cases in support of their views. From among the very large number of cases of postperitoneal infection we have selected for consideration those reports in which the patient had infection immediately behind the peritoneum rather than those telling of remote infections,

* Treves, Kelynack, and Hawkins declare the appendix to be "always intraperitoneal."

such as pulmonary, splenic, or hepatic suppurations. In many instances our efforts should be directed behind as well as inside the peritoneum, if not while the abdomen is open, then as a *dernier ressort*, immediately afterward, or as soon as required for urgent symptoms which may not have yielded to the customary intraperitoneal technique.

J. F. Baldwin[17] has collected 43 cases of deep infections (including subphrenic abscesses). His own 2 detailed cases were due to retroperitoneal suppuration. One patient had persistent elevation of temperature and pulse after an appendicectomy which continued for forty-four days (June 6th to July 20th), "yet without chills or sweats"; finally, lumbar abscess, incision. The other patient had decided septicæmia, with acute symptoms, chills, and sweats. First operation, appendicectomy, July 26th; second (post-peritoneal abscess), August 28th. Both patients recovered.

Among other operators who have recorded their cases are: M. L. Harris,[18] Graham, [19] Brault,[20] Stepp,[21] Mynter,[22] Gittings,[23] Nash,[24] Vander Veer,[25] H. C. Deaver,[26] La Place.[27]

How Infection Reaches the Retroperitoneal Space. Having reached the conclusion that a large number of fatal cases of appendical disease are directly due to retroperitoneal infection, we have to consider how and by which route infection spreads to the deep-seated tissues and organs in question.

1. It may proceed directly through the peritoneum to the cellular tissue behind, from an intraperitoneal abscess (necrosis).

2. It may reach the cellular tissue from a rupture (perforation) in a congenitally displaced appendix* (retrocæcal) or rupture into the mesoappendix, and this may be accomplished without intraperitoneal infection.

3. Infection by way of blood or lymph channels.

* If in 26 per cent. of all bodies the appendix lies more or less behind the peritoneum, this fact may be taken into account.

We know that communication between the appendicular and the portal veins by way of the ileocolic and splenic veins is direct, and accounts for many of those dangerous infections of the liver and other organs* (pylephlebitis).

The Position of the Appendix and its Relation to Retroperitoneal Infection. From our own observations we believe that in at least 2 per cent., and possibly 5 per cent., of all bodies the appendix lies in some part of its length outside the peritoneum, or behind the cæcum, or in contact with its muscular wall. Mauclaire[27] gives us an excellent idea of the retroadherent appendix,† and we produce one of his illustrations :

The direction of the diseased appendix has much to do with the results of its infection and possible perforation. Those cases in which the organ is to the left of the cæcum, or east to southeast, are most dangerous on account of the proximity of the mesenteric vessels and lymphatics. Thrombosis will result from an infection of these vessels and a train of complications follow, whose end may not easily be foreseen.

In a review of 572 cases by Monks and Blake,[28] they report the appendix down and inward in 179 cases. Down, 29; in, 62; up, 52; up and in, 39; up and out, 29; out, 9; down and out, 5; unclassified, 14; behind the cæcum, 104, or 18.2 per cent.

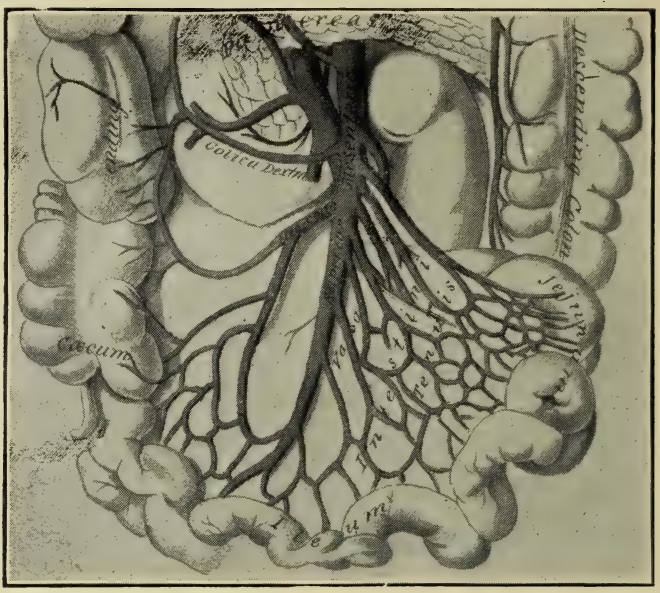
Fergusen in 200 cases found the appendix toward the posterior surface of the cæcum in 75; toward the right side in 19; within, 18; downward, 11; 77 times under the peritoneum.

Vladoff and Clodo say the appendix is most frequently found pointing downward or toward the bladder

* The coincidence of appendical and tubal or ovarian tissue may be explained in a similar manner.

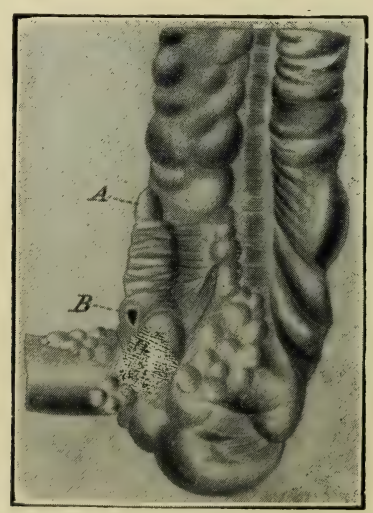
† Other writers also have described this situation of the appendix. (See Deaver.) The method of Deaver and others who describe the location of the appendix and its general direction by using the points of the compass is an excellent one, and we find it very satisfactory.

FIG. 1.



Shows the branches of the ileocolic vein, which may transmit infection from the vicinity of the appendix to the mesenteric and splenic veins. Infection and occlusion of the vessels in this region caused the fatal result in our fifth and sixth cases. (Adapted from Gray's Anatomy.)

FIG. 2.



Shows a posterior view of the cæcum and a small portion of the ileum. The appendix is shown in its retrocæcal position. The perforation marked B caused the death of the patient. (From Mauclaire, Bull. de la Soc. Anat., Paris, 1897.)

and rectum (41.5 per cent.); upward along the side of the colon in 13 (13 per cent.); in 9.5 per cent. of cases partly or entirely placed outside the peritoneum.

As before stated, our observations lead us to the conclusion that an adherent appendix pointing anywhere east or south is located over most important territory, and deep-seated infections resulting in septic complications occur most frequently in this manner. The inflamed appendix, when pointing toward the right side, or when adherent to the abdominal wall or on the right of the ascending colon, is favorably situated. Its rupture and resulting abscess, when in this position, may be readily handled by way of an anterior or posterior abdominal incision.

Those appendical abscesses reaching far up outside the colon may be drained by posterior incision above the iliac junction, in addition to the anterior incision. Such posterior location of the appendix in our experience has not produced systemic infection, nor have these suppurations been difficult to reach and drain. (Note subphrenic abscess.) On the other hand, the infections resulting from perforation of the adherent appendix when east to south have occasionally produced suppuration leading to pylephlebitis and remote abscesses. If the connective tissue below the pelvic brim is infected, gravity will favor extension of the infection toward the deep pelvic bladder, or femoral ring along the iliac or psoas muscle. Per contra, infection above this point may ascend toward the diaphragm and penetrate to the pleura or mediastinum. In this outline of our subject we can only mention possibilities, and frankly admit how difficult it is to discover at the time of operation in what way the infection has entered the retroperitoneal tissues, whether by way of direct transperitoneal or extra-peritoneal route. Our aim in this paper has been to establish the fact that retroperitoneal infection is a serious and not infrequent complication of appendicitis, and that the position of the appendix in relation to the peritoneum may furnish an explanation of these results.

Symptoms. The symptoms of retroperitoneal infection are mainly those of septicæmia, in addition to those of appendicitis. But there are some important and characteristic points of difference which require a detailed description. As seen in the statistics quoted from several authors, retroperitoneal infection can occur without associated appendicitis. It would be quite as well, or perhaps better, to say that perforation and retroperitoneal infection and suppuration can and do occur without peritonitis. In such cases we have the symptoms due to infection of the lymphatics, vessels, or connective tissue, with immediate systemic manifestations.

In this form of sepsis we have frequently observed rigors or chills and sweats, although occasionally these symptoms are absent. When present we may anticipate pylephlebitis with streptococcic infection of the organs in the upper abdomen or chest.

Persistent high temperature and quick pulse after appendicectomy should always lead us to suspect "posterior" complications. In the "delayed cases," in which one or two weeks have elapsed before operation, such symptoms are very significant. In these patients with appendicitis as a preliminary stage, we occasionally find improvement for one, two, or possibly three days after appendicectomy. Then a rise of temperature and pulse, with increased pain and malaise, will indicate a deeper infection. If such a rise occurs and is maintained, an explanation must be found. Such complications do not pass with some slight cleansing of the wound, or by attention to the patient's bowels. Under such circumstances, if one is absolutely sure of a clean peritoneum, he must not fail to remember the possibility of retroperitoneal infection. We have occasionally seen such symptoms after an ideal operation and have seen them disappear, even after manifestations of general sepsis with icterus. But such favorable termination is not the rule, but an exception. If these symptoms of sepsis have appeared prior to appendicectomy, it is absolutely necessary

that we should, at the time of operation, attempt to check what may be systemic infection.

Illustrative Cases.

Case I.—Retroperitoneal infection found at time of operation. Recovery.

Miss L., aged sixteen years. Previously healthy, without history of previous attack. Present attack began four days before consultation. The patient was seen with Dr. Appleby, her family physician, January 12, 1898. Her symptoms indicated a mild attack of appendicitis without peritonitis. A mass could be felt behind or under the cæcum, and we expected to find an abscess. There were no signs of general sepsis, nor was the pulse very quick. Highest temperature 102° F. At the operation the appendix was found adherent to the peritoneum below the mesentery of the colon pointing "south." It was necrotic and surrounded by pus, with fecal odor. Indications of retroperitoneal infection necessitated incision of the peritoneum, and we found a second abscess containing about an ounce of pus. Careful drainage was instituted by the transperitoneal route. Our drainage-tube was expelled from behind the peritoneum on the tenth day. Some days after this a discharge of creamy pus escaped suddenly from the wound, and evidently came from the space we had drained behind the peritoneum. After this there were no further accidents, and a complete recovery ensued.

Case II.—Appendicitis developing during convalescence after abortion. Prolonged fever and, finally, iliac abscess. Operation. Recovery.

Mrs. K., aged twenty-seven years, had a miscarriage of a six weeks' fœtus in February, 1898. As she was a member of a prominent family, several physicians were in attendance, and she was most carefully watched and every precaution taken to insure absolute asepsis. I saw the patient three weeks after her illness began, and consequently

all evidence of miscarriage had disappeared. The patient had fever and sepsis, which had refused to yield to treatment. Her history gave but little evidence of the real nature of her illness. The fever was thought due to the miscarriage, and as no cultures were made the interior of the uterus was "suspected" and appropriate treatment instituted, with the hope of checking the disease.

Careful examination showed no abnormality in or about the uterus or broad ligaments, but an induration extending from the cæcal point to and filling the right iliac fossa was easily located. The location of this pus was quite characteristic. It was not precisely in the line of the psoas muscle, being rather more to the right. At the time it was thought that its origin might be tuberculous. It was evidently not in tube, ovary, or broad ligament, consequently an incision was made above the crest of the ilium, downward and forward outside the peritoneum, and the abscess was reached without entering the peritoneal cavity. The odor of the pus was characteristic of fecal contamination, and we easily located its origin at the cæcum. The patient made a rapid and satisfactory recovery.

Case III.—The patient had symptoms of rheumatism. Then a retroperitoneal abscess was discovered, which explained the symptoms. Recovery.

H. F., aged sixteen years, with a history of one attack of appendicitis, had a second attack July, 1899. The usual signs of appendicitis without rupture or peritonitis, with hard mass under cæcum, indicated an abscess already formed.

The patient had what is usually called a "mild attack"; there appeared to be no necessity for immediate surgical relief. The attack simulated rheumatism, which refused to yield to the usual treatment. The muscles and joints of both legs were involved, but the symptoms were not characteristic, and finally, in his search for an explanation, the physician, Dr. Sprigg, found the abscess under the cæcum. Operation was performed on the sixth day at

patient's home, with the assistance of Dr. Sprigg. The abscess was evacuated, the appendix removed, and a second abscess found behind the peritoneum. The appendix was "south" in this case, and the conditions found were almost precisely as in the first case mentioned. The treatment was by transperitoneal drainage, and was continued for five weeks before a cure was effected.

In these cases we had to deal with a mild form of infection, and there were no dangerous symptoms at any time during the convalescence.

It is well, however, to reflect upon what would have happened had we not found the retroperitoneal infection at the time of operation. It is evident that such cases frequently occur, and in this manner is explained the long and tedious recoveries after "easy operations," and occasional burrowing of pus toward Poupart's ligament, or upward toward the diaphragm.

Case IV.—Appendicitis associated with sepsis. Appendicectomy affords no relief. Thrombophlebitis and gangrene of cæcum and ileum. Death.

Mr. L., aged twenty years, a medical student, had one attack previous to July 5, 1901, when first seen by me with his family physician, Dr. Klipstein, in a neighboring city.

The patient had the usual symptoms of appendicitis, such as pain at the cæcal point, with digestive disturbances, and added to these had typical sepsis, with rigors and sweats.

Our fears as to the patient's condition were not relieved by the operation. We found a gangrenous appendix, with enteroliths deeply buried in an abscess either in or under the mesentery of the cæcum. The peritoneum was congested and thickened around the field of operation, but there was no diffuse peritonitis. There was, however, what we afterward found to be retroperitoneal infection. The mesentery of the cæcum was thick and inelastic. It was with much difficulty that we raised the cæcum sufficiently to reach the base of the appendix, in order to remove it and close the bowel. The indications were clear to open into the infected

area, and perhaps make drainage through the loin or over the iliac crest. We erred here irretrievably, and lost our only opportunity to save the patient. Although our drainage was carefully placed by way of our incision over the cæcum, nothing was accomplished by our operation. We should have opened up the retroperitoneal space through an incision over and in front of the crest of the ilium, and should have made careful search for the infected area. Not having done this, our patient went from bad to worse, without the least benefit from the intraperitoneal work. We feared to incise the peritoneum when we had the abdomen open. We were absolutely certain that we had a streptococcic and possibly a mixed infection to deal with, and this was finally demonstrated by bacteriological examination. On the fifth day a fecal fistula was formed, and immediately after this came gangrene of the cæcum and lower ileum, due to ileocolic phlebitis. The patient died of septicæmia on the seventh day after operation, having had repeated chills and every symptom of profound toxæmia.

The autopsy disclosed extensive postperitoneal cellulitis, with entire obliteration of the vessels supplying the region of the appendix (ileocolic arteries and veins). We were not allowed to extend our incision or examine the liver or spleen. Cultures made from the retroperitoneal pus showed streptococcic mixed infection.

Case V.—Septic appendicitis. Retroperitoneal infection. Primary and secondary operation. Death from sepsis.

B., a boy, aged fourteen years, had his second attack of appendicitis in June, 1901. The attack was typical of appendicitis, with the addition of a chill and septic indications. The first consultation with the family physician, Dr. O. Leech, was held June 25, 1901. The boy was vigorous and previously healthy, and gave every evidence of being well able to bear operation, although he now appeared ill, and we saw unmistakable signs of systemic infection, which indicated, as in the preceding case, a very unfavorable prognosis. Operation was performed on the

fifth day after his first symptoms. Repeated chills, high temperature, sweats, and general malaise indicated extension of the infection to the lymph channels or retroperitoneal cellular tissue, and our operation gave no relief whatever. There were no signs of peritonitis. A small amount of pus was found when we removed a very soft and necrosed appendix. Indications pointed to retroperitoneal infection, and we resolved to make additional incisions if relief did not follow appendicectomy.

We made a second incision on the third day after operation, thinking we might discover pus in or under the mesentery of the ascending colon, and opened up the retroperitoneal space by pushing the peritoneum well forward until we were successful in evacuating a small abscess, located behind the mesentery of the cæcum and the adjoining ileum. Here we again hesitated to explore deeply, fearing to carry infection into healthy territory.

It was possible to raise the peritoneum from its bed or posterior attachments, and we could easily have extended our incision so as to reach the entire area between the vertebral column and the iliac fossa. We probably lost our only opportunity here. We did not succeed in reducing the high temperature or in affording any substantial relief to the patient, who survived the second operation only four days. The autopsy was very imperfectly performed, being limited to an examination of the wound area through the incisions already made. We found the peritoneum dark, and, indeed, almost necrotic on the mesenteric and posterior surfaces. A general or diffuse infection had spread rapidly from the mesentery of the cæcum behind the peritoneum, causing all the bad symptoms presented by the patient. Here was a repetition of nearly every symptom shown in the preceding case, and while we were ready to go to the limit of our patient's strength, if necessary, in our next operation, still we were unsuccessful, as will be seen.

Case VI.—The patient, who was sick twelve days, was subjected to operation for appendicitis. Abscess was dis-

covered in the mesentery. General septicæmia. Gangrene of intestines. Death in three weeks of thrombophlebitis and infection of retroperitoneal space.

M. D., aged seventeen years, a fairly healthy lad with a history of one previous light attack of appendicitis, was taken ill in May, 1903, while in a distant city. His primary symptoms were clearly those of appendicitis, and an operation was proposed, but declined, as the patient seemed to improve. His pulse was but slightly accelerated, and his temperature not above 101° F. plus at any time previous to his return home on May 30, 1903.

When seen by his family physician, a week after the first symptom, there were no signs of peritonitis, yet a small mass could be felt, which appeared to be an enlarged and adherent appendix. His temperature would drop down to normal on alternate days, and he was consequently subjected to antimalarial medication. He was seen in consultation with his physician, Dr. H. T. Harding, on the eleventh day of his illness, and operation set for the day following. We had no reason to fear the outcome of this operation. The patient had no serious symptoms of sepsis. His condition was most excellent, and not until the time of operation did we suspect infection of the mesentery.

Operation was performed on the twelfth day after the initial symptoms. The peritoneum everywhere appeared healthy. The appendix was covered over by the caput coli and ileum, which were firmly adherent. The base of the appendix was first discovered, and afterward the whole organ was located and removed, although it was so necrotic and its appearance so much changed that it could scarcely be recognized. A small amount of pus was found around the appendix, and after a careful search another abscess of small size was found, which was carefully cleansed and sterilized. This abscess was situated in the mesentery immediately under the location of the appendix, which was northeast, or between the cæcum and vertebral column.

In close proximity to the abscess cavity we found in the

mesentery some rather interesting features, although not necessarily related to the present illness. Immediately under the location of the appendix, which was northeast and to the left of the cæcum, and between its mesentery and the vertebral column, we found several greatly enlarged and calcified glands, which were in the mesentery of the lower ileum, and which gave to the finger the sensation of large enteroliths* which might have escaped from the bowel through the ruptured appendix.

An abscess was discovered behind the mesentery immediately upon the psoas muscle, and we made extraordinary efforts to deal carefully and thoroughly with the conditions found. Rather less than an ounce of pus was evacuated, after which a rubber drainage tube was placed and secured in position with catgut sutures. This tube was placed in the cavity of the abscess, and it would have provided all necessary drainage if no other infections had started. The infected area about the cæcum was packed with gauze, and we confidently expected to save our patient after our most careful and complete operation. Although the patient had been sick for twelve days he was in good condition, and left the operating-room with a good, although somewhat accelerated pulse (120 per minute).

The immediate effect of the operation was only fairly satisfactory. There were no symptoms of bowel obstruction or peritonitis at any time. A fecal fistula developed, and then sloughing of the bowel began, shown by the discharge of large pieces of necrosed ileum. The patient's condition was one of severe sepsis, and we were obliged to content ourselves with the hope that his strength would continue until the force of the infection expended itself. Certainly no surgical relief appeared possible, and even with the lesson of this case with the autopsy, and the experience gained in treating the others mentioned, we fail to see how

* These calcified glands were afterward examined and found to be of mesenteric origin, and their condition a result of former tuberculosis.

the fatal result could have been averted unless extraordinary measures had been tried at the time of operation.

The autopsy was made soon after death, and revealed general extraperitoneal suppuration extending in every direction from the site of the abscess found at the time of operation, three weeks previous.

Fully twelve inches of ileum had sloughed, and of this, several inches had been discharged. Owing to the long-continued fecal discharge from the sloughing bowel, the peritoneum in the region of the wound and below this point in the right side of the pelvis was dark and almost gangrenous in appearance. By far the most interest, however, lies in the extent of the infection in the cellular tissue behind the peritoneum. The infection had reached to the right kidney, and, indeed, a considerable quantity of pus was found here. It appeared to have extended along the psoas muscle in the direction of the diaphragm, and we also noted the involvement of a considerable area over and to the left side of the vertebral column. The tissues removed for examination consisted of portions of the cæcum and ileum, with the mesentery adjoining. Owing to careless methods, the specimen was not so carefully preserved and examined as we had hoped. Enough was seen, however, not only to disclose the cause of death, but to throw some light upon the extensive tissue changes found. The probable course of events was as follows: First, a tuberculous glandular disease, occurring in childhood, which was confined to the lymphatic glands within the mesentery. The calcareous condition had succeeded the "caseous stage." A cure was completed as the calcification was completed. Then, after one or more very slight attacks of appendicitis, the organ adhered in an upward direction, pointing "northeast," between the mesocolon and vertebral column, immediately over the calcified glands. Finally, a severe infection within the appendix caused a rupture at the distal extremity, and an abscess formed, with the resulting retroperitoneal infection. The gangrene of the gut was

due to infectious phlebitis, and probably arteritis, for we found sloughing of all that portion supplied by the ileocolic artery and veins.

Conclusions.

In our first three cases the infection was probably due to one of the less active but destructive bacteria, as the clinical history was not marked by chills, sweats, etc., and without extension to distant organs or tissues. A streptococcic infection, for instance, would have caused far more serious results, such as pylephlebitis, etc. The next two were due to streptococcic, associated with other micro-organisms, constituting a mixed infection, as shown by cultures made at the time. The last case was due to the colon bacillus, likewise mixed with other germs. Our patient had persistent fever with sweats, but without chills or rigors. Moreover, he continued his brave, although unsuccessful effort against infection for three weeks after operation, while the streptococcic mixed cases succumbed in far less time.

Given the opportunity at the time of operation, we may, as in our first, second, and fourth cases, make provision for the inevitable retroperitoneal infection and suppuration. The question, then, is one of radical methods and abundant drainage. In our fatal cases there was need for postperitoneal drainage applied above or in front of the sacroiliac junction. The question arises, Shall we in the future always provide such drainage at the time of operation, even at the cost of severe traumatism and prolonged operation ?* There is but one answer to this question. Sound surgical principles demand complete operation, and we do not believe an operation complete in all cases when the appendix is removed. It was impossible to drain successfully in all of our cases through the peritoneum. Drainage was fairly

* By posterior drainage we have reference to retroperitoneal drainage, and do not refer to lumbar incision, commonly employed in intraperitoneal cases.

satisfactory while the tubes remained in position; but it is impossible to drain safely the retroperitoneal space by the transperitoneal route, and it is obviously better to attempt such drainage from behind. The anatomical formation of the retroperitoneal space renders successful drainage rather difficult and occasionally impossible. It is, however, of the utmost importance to expose fully any infected region behind the peritoneum if the symptoms preceding the operation, and the pathological changes found at the time of operation, plainly indicate retroperitoneal infection. The retroperitoneal space is one of greatest interest and importance, for here we not only have mesenteric vessels, but lymphatics, and the thoracic duct is not far distant.

When we suspect retrocæcal or retroperitoneal infection as a complication of the appendicitis, we should, as a rule, make a careful search for the infected area, and provide drainage by the posterior route, whenever practicable. When postcæcal the incision must be ileolumbar and the peritoneum pressed forward, much as when one exposes the ureter. In all cases in which we have to deal with infection of the mesentery of the cæcum we will find it possible to reach this area through the incision named, especially when suppuration has begun. When the abscess lies under an appendix "east" or "south" of the cæcum we may have greater difficulty in reaching the seat of infection, but this entire region is to be searched for induration or commencing suppuration before we are justified in abandoning a patient to the perils of septicæmia. If suppuration has begun it will invariably be much easier to locate the pus, even if very near the vertebral column, in which case we would be compelled to expose the mesenteric vessels supplying the cæcum. In our cases we find it far easier to open this space than we had expected, and we propose to continue our search in future for retroperitoneal infection along these lines. We may yet learn to discover retroperitoneal infection at the time we usually operate for appendicitis. Indeed, this is our earnest wish, that we may be able to check this

form of infection before its ravages have extended beyond our reach. It appears a plain duty in certain septic cases to investigate the retroperitoneal space with the same care as the cavity of the peritoneum.

1. We should consider every "delayed case" with anxiety, lest there should be retroperitoneal infection.

2. We should be careful to give a guarded prognosis in every case of appendicitis ushered in by or complicated by chills or any symptoms of sepsis.

3. If operating in such cases we should consider retroperitoneal infection as already started, and act accordingly. The discovery and proper treatment of such infection is quite as important as the usual intraperitoneal technique.

In view of the possibilities of retroperitoneal infection, we assume a great responsibility by advising non-intervention in appendicitis, and while we often advise delay when we believe the lesions strictly intraperitoneal, yet it would appear that such a course is very unsafe and to be condemned when we have reason to fear the complications above described.

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NOTES ON THE SHORT INCISION IN APPENDICITIS.

By Robert T. Morris, M.D.,
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My views on the subject of short incisions in appendicitis work have been the bone of a good deal of contention. The beginner in surgery is inclined to make incisions that are too short, rendering his work more difficult and very likely incomplete. This is a fault of the beginner in surgery. However, with the establishment of confidence in his resources, the tendency is to make freer and bolder incisions, and it was not so long ago that operators prided themselves on the boldness and freedom of their incisions. Further training would enable these same operators to become more expert in methods that would prove advantageous to the patient, besides giving the surgeon the satisfaction that goes with personal confidence. The surgeon cannot do good work, particularly in abdominal surgery, if he begins it with incisions that are too short. He cannot do the best work if he continues to make incisions that are too bold and too free. After one has acquired a certain amount of skill in technique he can revert to the shorter incisions, which will allow the patients to escape with the least possible attack of incision. Even a bear has been known to die from too much incision, and we must bear in mind the fact that in dealing with patients the incision we make is of some consequence. In New York some years ago, in appendicitis work, it was the custom for us to make such large incisions that many of our patients developed postoperative hernia; many suffered from shock; many

suffered from the effect of the gauze packing that was used. We committed taxidermy on these patients, and the final results were so bad that operating for appendicitis almost fell into disrepute. It was a difficult thing to get the practitioner to say to his patient that he or she should have operative work done in case of appendicitis, because of the results in making incisions that were too long, longer than necessary, with consequent damage to structures. With long incisions we have more shock ; we have more adhesions, for two reasons : (1) Because the exposure of the peritoneum through a long incision excites a greater inflammatory reaction, results in more peritoneal adhesions which must be disposed of or which may remain to make the patient life-long trouble. (2) The longer the incision the greater the danger of infection from the aerial bacteria, or, with long incisions, the general resistance of the patient is interfered with. The better the condition of the patient when we are through with the operation, the better recovery he will make is a truism all of us know. A patient in good condition at the end of an operation starts out rapidly toward good recovery, for the reason that his cell resistance is at its best, and with the best cell resistance he meets bacterial invasion in the best way, so that if we can accomplish with incisions that do not shock the patient as much as we can accomplish with long incisions, we start him on the road to recovery with a better general cell resistance against bacterial invasion.

In appendicitis work I began with long incisions. We were all making them. I used gauze packing, and separated adhesions by sight. I thought it necessary to wipe out all pus that was to be found. I did not know any better then ; but now some of us know better, and we know it is unnecessary to do all this.

In cases of primary infection of the appendix, where the infection has not gone on to pus formation without adhesions, we can remove the appendix through a small incision. Personally, I find an incision of about an inch and a half

long, which keeps the patient in bed for about a week and a half, is the best one to use, but that must vary with the individual operator.

In adhesion cases, the interval cases with extensive adhesions, one will have little difficulty in working through short incisions after his sense of touch is trained. By the sense of touch he may do in ten minutes work requiring half an hour by sight. In cases in which there is an abscess present, or the peritoneum is filled with septic fluid, I have recently come to believe the short incision is the best, on the ground that it leaves the patient in better condition to resist future infection or the continuance of present infection. We have learned not to fear a little pus in the peritoneal cavity. I much prefer to leave behind considerable pus in the peritoneal cavity rather than to resort to several minutes of sponging. That point, perhaps, needs a little elaboration, the elaboration including the question of the kind of infection, the stage, and degree of infection. With violent onset, the bacteria proliferating rapidly, it is more important to remove most of the fluid carrying the bacteria and the toxins than in a case in which the bacteria have practically committed suicide with their toxins. But our old time fear of pus in the peritoneal cavity is practically a thing of the past. We have been waging sharp warfare over the subject, and have observed and are finding that the great lymph chamber, the peritoneal cavity, properly managed, is our best assistant, and we may allow it to dispose of pus, which it will do better than we with our various methods of washing and of sponging. Of course, in some cases it is very essential to make long incisions where complications demand that the work be done by sight, but these constitute a comparatively small proportion of cases. I will make this statement: one should make as long an incision as he feels he needs, and by no means be guided by the idea that he is to conform to any length of incision, the idea being that if we can allow a patient to escape with a mild attack of incision, let us do it.

THE SIGNIFICANCE AND MANAGEMENT OF PARALYSIS OF THE BOWEL.

By George S. Brown, M.D.,
Birmingham, Ala.

Paralysis of the bowel may be caused by the shock of a blow upon the abdomen, injury to the nerves that supply the muscular coats of the bowel, and by inflammation of the peritoneum. The latter cause is by far the most common, and it is of this form, more particularly that following operations in the abdomen, that I have dealt with in this paper.

When there is inflammation of the serous covering of a portion of the bowel there is a corresponding indisposition of the muscular coats of that portion of the bowel to carry on the usual peristaltic movements of health. This varies, of course, with the degree of the inflammation, the latter varying according to the nature of the infecting agent and the proximity to the point of original infection or injury—such, for example, being the diseased gall-bladder, appendix, or tube.

The paralysis varies from the slight sluggishness of the outlying and least affected portion to the complete state of the well-defined inflammatory area.

This quieting of the bowel in the presence of inflammation is to be regarded not as a pathological condition to be combated, but rather as nature's way of allowing the plastic exudate, which is being thrown out, to form adhesions, the use of which is to confine the infection and the products thereof to as limited a field as possible. This method of

nature's, arrived at doubtless by the long process of selection, is clearly the only way in which this could be accomplished.

Before the days of such general surgery this condition, as the thing to be expected and desired, was so clearly recognized that opium was given to further it, and this treatment was spoken of as splinting the bowel. Owing to the rapid evolution of abdominal surgery during the last quarter of a century, the present generation of surgeons have, to some extent, lost sight of this understanding of the subject. Others who have not lost sight of the teachings of the past generation have largely discredited it for the following reasons:

First, because of the undoubted harm that frequently comes of the overdistention caused by paralysis of the bowel containing food; second, the occasional harm that results from adhesions; and third, and most important of all, admitting the curative tendency of the paralysis as furthered by opium seemed to imply the non-surgical treatment of all cases of peritonitis.

This linking of these two ideas seems to me to be wrong, for the very good reason that, while paralysis of the bowel and opium *are* curative in their *tendency*, such treatment alone cannot, perpetually and in all cases, combat the effects of nor remove an offending foreign body such as a diseased appendix, gall-bladder, or tube, nor the collections of pus and infected patches of exudate and adhesions resulting from any of these. Nor can such treatment always successfully meet the terrible symptoms caused by *overdistention*. The burden of this argument is, therefore, that the proper management of inflammatory conditions of the peritoneum is to first of all remove the offending foreign body as thoroughly as possible, give good drainage to the infected surfaces which cannot be removed, and then assist nature to complete the cure in her own way by furthering and encouraging the paralysis of the bowel, but at the same time controlling the overdistention.

As between the operative and the medicinal treatment of

appendical peritonitis, for instance, Ochsner's plan seems to be the best, as far as it goes, that has been advanced—that is, of washing out the stomach and bowels and keeping them empty of all food and purgatives. This has caused some reaction, at least theoretically, against operating in the desperate stages of the disease, in that it has shown the very great power nature has of taking care of very bad conditions when she is given a chance. What is needed, however, is greater emphasis to be laid upon what this plan of nature's (and Ochsner, if you please) can do if applied *after* operation.

After the offending foreign body has been removed and the almost equally dangerous adherent places wiped and washed clean and properly drained, my experience leads me to believe that this rest treatment will cure many of the most desperate cases of peritoneal inflammation with which we have to deal. Prolonged irrigation of the stomach before the patient leaves the table, the application of a broad and tight abdominal binder, and opium are the sheet-anchors.

Peristalsis is probably never entirely suspended in the normal bowel, but it is nearest so when the stomach and bowels are empty; but in severe inflammatory conditions the paralysis is probably complete, and nothing can pass through it; therefore the stomach irrigation should be continued as long as any stain from the contents of the bowel comes away in the wash water, for if any food is left the fermentation of it causes gas. This being unable to pass causes overdistention, and it is this complication of the paralysis and not the paralysis itself that is so difficult to deal with.

This overdistention is resisted in a feeble way by the muscular coat of the bowel; this giving way the abdominal muscles stiffen up and do their utmost to control it, but in severe cases, unless supplemented by the tight binder, they, too, finally give way and, the gas continuing to form, are themselves overstretched and become flaccid. If a little of

this gas can be let out through a small puncture or should pass in the natural way, it will often allow the bowel to regain its tone and throw off the trouble. This is well recognized in some cattle-growing countries. I have heard that in Tennessee when one farmer sees another's cow apparently dying from the effects of an overdistended abdomen, it is considered an unneighborly delay if he stops to inquire into the cause of the trouble before plunging a knife into her and letting off the gas, so firmly is it believed to be curative in most cases.

Letting off a part of the gas after nature has controlled the inflammation by means of adhesions allows the muscular coats of the bowel to recover their tone, the peristalsis wakes up, and the contents of the bowel are carried off in the usual way. The application of the tight binder will in most cases prevent this condition of overdistention by supplementing the resistance of the abdominal muscles. When the degree of inflammation is slight and the bowels are merely sluggish, say on the advent of an attack of appendicitis, purgatives will move the bowels and relief will be obtained, and in many instances the attack will pass, and in a few instances will never return, and this it is that makes purgatives so popular with the general practitioners before operation, and with not a few surgeons after operation. The fact remains, however, that a very slight degree of inflammation will often cause any amount of purgatives to fail to act, and if they should act during the first stage of the inflammation and the patient get better, experience should lead us to know that the chances are great that the disease is progressing to a point where they will *not* act. When the inflammation has ceased to spread, that is, has been walled off (either without or after operation), the paralyzed bowel will gradually wake up, and then the purgatives will act. But if they are given *before* this has taken place they are liable to prevent or delay the formation of adhesions, and at the same time cause a regurgitant vomiting that will rapidly exhaust and kill the patient. When the bowels move, the

patient, as a rule, gets rapidly better, but they move because he is already better. It is not the cure but merely the indication, a symptom, of improvement; hence our endeavor should be not to wake up the paralyzed portion, but to try to keep the upper uninflamed portion quiet until the inflammation has been controlled and the paralyzed portion gives a sign (usually by the passage of gas from the anus) that it is waking up.

Purgatives given in the medical treatment may cause the rupture of an intraperitoneal abscess, and the patient may still be saved by prompt operation, but purgatives given just before or after operation that have not been washed out are very likely to set up a dangerous regurgitant vomiting.

A few years ago, before adopting the rule of washing out the stomach, I had two patients to operate upon for rupture of intraperitoneal abscess due to gangrenous appendicitis. As the inflammation was severe and widespread, the toilet of the peritoneum was made in a very thorough manner, and all infected corners drained. They both had post-operative nausea for three or four days, with very badly tainted bilious vomit. Water was denied the first one, in deference to the then universal superstition, and the tight binder was not used, and the tympany was extreme. Opium was given liberally, however, to the first patient, and he had a good deal of rest, from which he always awoke to vomit and beg for water. He finally managed to reach a pitcher containing nearly half a gallon and drank it all. He vomited this, and then got rapidly better, and had no more nausea. The second patient, whose condition was almost identical with the first, had all the water he wanted from the first and all the opium, but did not have irrigation of the stomach nor the tight binder. He had very great overdistention for three days, and I was strongly tempted to puncture the intestine which was presenting in the wound, but I did not, and after a stormy time of four days of vomiting the water he drank the gas passed and the distention went down. Since these cases I have never failed to

use the irrigation tube, the tight binder, and plenty of opium and water, and the convalescence of the patients has been comfortable and uninterrupted in all the cases that recovered.

It seems clear to me that too little attention has been paid to the after-treatment of these patients operated upon for peritonitis. The prevalent idea is that if the bowels can be made to move all will be well, and this is true, so the rule is to give purgatives. But if the inflammation is severe and active the bowels will not move and the purgatives will set up a regurgitant vomiting which will continue until the stomach and bowels are empty or until the patient dies. I believe that many of the deaths that are attributed to general peritonitis after operation for the severe inflammation of appendicitis are really due to the exhaustion from vomiting and the overdistention, and could be prevented in the majority of cases by the means I have indicated. In support of the first belief allow me to report two cases, briefly :

George O., aged twenty-eight years, had been suffering with nausea, pain, and fever for five days. This was thought to be due to the passing of a renal stone. On the fifth day he had a severe pain and went rapidly into collapse. Six hours after this I was called in and found him cold and cyanotic up to the elbows and knees and with no pulse at the wrist. He rallied after several hours, and then his temperature was 104° and pulse 120. The abdomen was enormously distended, painful, and tender, and he had constant regurgitant vomiting. It was the sixth day of the disease, and the diagnosis of general peritonitis, due to rupture of a large abscess, seemed so plain that we refused to operate, and he died the next day. The autopsy showed an abscess occupying the whole right side of the abdomen and containing a large quantity of pus. It was plain that this abscess had formed after the rupture of a smaller one. It was well walled off with new adhesions, and I have thought that the patient might still have been saved had it been

opened and drained without disturbing the adhesions. In such cases it is hard to say whether or not the peritonitis is general or limited, because the symptoms are so exactly the same in either case. When, however, after symptoms of collapse the patient reacts as this one did, I believe that even in the most desperate cases there is a chance at least that the inflammation has been walled off. It is in these cases, where the peritonitis is extensive but not general, but where it is impossible to say which it is, that gastric washing, opium, and the tight binder, and plenty of water after operation may save the patient, when the use of purgatives and the suffering caused by withholding opium and water would not.

Miss R. W., aged twenty-three years, had always been in good health until an attack of appendicitis in the early part of 1901. In May of the same year she had another attack more severe. A physician was called in who gave her castor oil, from which she had much relief. Two days later, however, the symptoms were much worse, and the doctor persisted in giving her more oil for two days. During this time he gave her eight or ten ounces, which did not act at all and was not vomited. On the fifth day of the disease I was called in and operated, with her temperature 104° and pulse 124. She had a violent diffuse peritonitis, and the cavity contained a large quantity of seropus and a gangrenous appendix. This operation was done ten miles in the country, and the stomach-tube was not used on account of its having been forgotten when we left town. She was left in charge of a good nurse, and was directed to have all the water she wanted. We hoped that if she vomited this would sufficiently wash out the stomach until next morning. Next morning, however, she was still vomiting, although her pulse was only 110 and her temperature 101°. Her stomach was washed out, but not for as long as it should have been done, as the vomiting continued and the matter still contained oil. We regretfully concluded that it was a case of general peritonitis (as,

indeed, there was no symptom lacking), and she died two days later. The autopsy, however, surprised us a good deal. There was a very large but well-defined inflammatory area on the right side which was well walled off and draining.

In the three days after the operation nature had apparently cured the inflammation of the other parts of the peritoneum, as they were to all appearances perfectly normal or nearly so. There was no fluid present here and hardly any redness. This was one patient at least whose death, it seemed to me, was due to the exhaustion of regurgitant vomiting superadded to the general sepsis already present, together with the sepsis taken up from the large but limited surface of infection in the right side of the abdomen. With the experience of several other cases like it, and worse, I am very strongly of the opinion that this patient would have recovered had the bowels been free from the castor oil. I also believe now that many cases die from regurgitant vomiting due to the presence of food or purgatives, and that autopsy would show that they did not have a general peritonitis. When patients live five or six days after operation and then die from or with regurgitant vomiting, there is always a suspicion, at least, that the vomiting might have been the main factor in the result. When, in other words, a patient is already past the point where operation could save him he usually dies from the shock following it.

Of a total experience of ninety cases of appendicitis, with seven deaths, sixty-six were pus cases. The first death was due to the rupture of a large extraperitoneal abscess into the peritoneal cavity at the time it was merely incised. The second patient was in collapse at the time of operation. A gangrenous appendix was found ruptured and pouring out the contents of the bowel. The veins were black, and there had been no reactive inflammation. The autopsy two days later showed the same appearance of the peritoneum, and there were no adhesions. There were two other cases

of old abscess under the diaphragm which afterward ruptured into the lung. One of these died of septic pneumonia, and the other from exhaustion and sepsis. Neither of them had peritonitis. Of twenty-four cases that had rupture of intraperitoneal abscesses and gangrenous appendix, twelve had severe diffuse peritonitis. Of these three died. One, as I have shown, probably died from the effects of regurgitant vomiting, caused by castor oil which was not washed out after operation. The other two did not rally from the shock of operation. In one of these the incision was made through the rectus muscle, and owing to the great distention there was much difficulty in irrigating the cavity without floating the bowels out of the wound. Owing to this complication the time of operation was prolonged, and the washing was not done thoroughly. When there is much tympany I have thought that the incision made low in the side to be far superior to any other in the advantage it gives in handling and cleansing the bowels with no danger of their prolapse. On the other hand, it is most difficult to properly clean out the cavity if the incision is made in the dome-like convexity of the distended abdomen.

I have here a siphon that I have used a good many times in flushing out the cavity after breaking up all adhesions and wiping away the greater part of the infectious material found. With this tube and the incision low in the side it is a very easy matter to flush out the cavity without prolapse of the bowel. The bowels float up into the concavity of the dome, and the tube can be passed to all parts of the abdominal cavity with ease. When the cavity is full of water the bowels may block the return flow, but the siphon tube will carry it off. In conclusion, allow me to repeat that I believe the rest treatment, that is, with stomach irrigation and starvation as to food and purgatives, will cure many cases of peritonitis of the most desperate character if applied *after* operation and combined with the tight binder, to prevent overdistention, and plenty of opium and drinking water to make the patient comfortable, because such treat-

ment will not only prevent tympany and regurgitant vomiting in nearly all cases, but it will prevent the spread of the inflammation by means of adhesions and will give nature a chance to cure the inflammation already present.

To quote Prof. Woods Hutchinson's recent splendid article entitled "Appendicitis as an Incident to Development": "Our function as a profession is, as usual, merely that of a handmaid to nature; first, intelligently discovering what she intends to do; and second, helping her to do it to the best of our ability."

DISCUSSION OF THE SYMPOSIUM ON APPENDICITIS.

Dr. W. L. Robinson, of Danville, Va.—This is a subject in which every member of this Association is deeply interested. Every day we hear of failures from operations on account of so-called conservatism on the part of our best physicians to save patients under these deplorable circumstances. The first essayist made a plea for conservatism, in that he argued for early operation. That plea is one which reaches me with great force. When I realize that there is no symptom or combination of symptoms that indicate the true pathology inside of the abdomen before we operate, neither the temperature, the pain, nor any other symptom that tells us what is lurking there, it is a strong plea to operate at once when we make the diagnosis. It is true the ground is taken that there is a walling off, that there are certain advantages derived from waiting; but when there are symptoms present which indicate to you that suppuration or gangrene of the appendix has taken place, the sooner you operate the better, although it is not possible to save all of these cases. There are other cases you can save by operation, and, therefore, I undertake to say that we will save a large number of cases by resorting to operation when the diagnosis is made.

I came here to learn, and I hope this discussion will teach me something.

With reference to the paper read by Dr. Baldy in regard to inflammations in the pelvis or the appendix itself, while I have not had much experience in the line he refers to, the few cases I have had teach me something. In the spring of 1891 I was called to see a case of puerperal infection in a distant town, from which the woman recovered. Subsequently, about three months afterward, I was called to see her on account of obstruction of the bowel. I visited her when she was in collapse, unconscious, pulse not perceptible at the wrist. I operated immediately, as she had

all the symptoms of obstruction of the bowel. I found a gangrenous appendix attached to the brim of the pelvis, also obstruction of the bowel. A rapid operation, with excision of the appendix, and leaving the belly full of salt solution saved the patient.

Dr. Stone's paper was one of great interest to me. Fifteen years ago I was taught a lesson by that great man in Virginia to whom we all look with pride, Hunter McGuire, who, in an operation performed in my town, after he had entered the abdomen, found the appendix floating out, and said with the teachings of the present day we should be content to drain rather than to do a prompt and nice operation. But the retroperitoneal infection resulted in the death of the patient. Since that time I have seen the mortality increase more from that cause than from any other, and I wish to thank Dr. Stone for his paper on that subject.

In 1891 I was called to see a lovely girl some eighty miles from my town. She was suffering great pain, which induced me to think she had appendicitis, yet the pains were near the gall-bladder. She was so much better by the time I arrived that an operation was declined. Three days later I was recalled in consultation with Dr. Gayle, and when I operated I found nothing in the McBurney region, but on going high up I found a large sinus and appendicitis, the point of which had attached itself behind the gall-bladder.

Dr. Charles H. Mayo, of Rochester, Minn.—After all, the question of surgery is a matter of personal equation and of a man's ability to apply judgment to his work, and the better surgeon is he who has no rules laid down. The minute a man begins to apply rules to his work, then his mortality will necessarily, for the time being, be high until he educates the community in which he resides as to his ideas upon this subject. So in a certain neighborhood, if out of ninety cases we have sixty-six cases of suppurative appendicitis, it is but a short time before the public will learn that the deaths will occur in the pus cases, and that the other cases probably will get well without mortality. Now, it is not going to take that community very long to realize that early operation is the thing to be done, and that deaths are due to delay. Then, there are a few things in which we as surgeons all agree in this work, and among them that early operations give a very low mortality. Operations made within thirty-six or forty-eight hours after the onset of the disease, the statistics are nearly the same in the hands of all average general surgeons; that the late operations give a low mortality after the end of the first week. This being so, why do so many deaths occur? If you will notice a good average surgeon, a man of considerable ability, and watch his work, you will find he loses but few of the primary cases in the first two days. Continue to watch his work, and you will see that 75 per cent. of his deaths occur from operations made after the second day and before the seventh. So the question

of when to operate is to a large extent due to a man's judgment in these cases. It is poor policy to have any rules laid down. If we are going to lay down any rule it should be that operation for appendicitis, when performed when the condition is local at any period of the attack, is comparatively safe. The next class of cases are those in which the patient shows a pinched face, quick pulse, elevation of temperature, his general appearance being that he is sick all over. It is not alone his appendix that is now at fault, but through the reaction of absorption his whole system is making a fight against that disease. If we operate at this particular time we may add insult to his efforts at repair.

The next cases are those in which the symptoms are mixed. We have marked local and general symptoms. The general symptoms are not as marked as the local. There may be partial obstruction of the bowels. Those are the cases that every man must work out for himself, rather than depend upon any information he may get out of papers that are read before societies, and his mortality will depend upon his judgment.

I have seen a number of cases of the class referred to by Dr. Stone. They are the most serious type of cases. They are septico-pyæmic cases, because we have behind the peritoneum this enormous lymphatic circulation, with its absorbents, and so in these cases the widest and freest drainage is necessary.

With reference to perforation of the intestine in cases of appendicitis, I will say that ordinary appendicitis in our experience does not cause perforation of the bowel sooner than twelve to fourteen days, or between that time and eighteen days. There is another type of case which has been doing very well, which has been running a normal course, but which you have not seen early, and you find all of a sudden a coated tongue, an absolute picture of typhoid fever coming on at the eighth or tenth day of sickness, before the period at which you would expect perforation. The great majority of these die, but they die as typhoid fever cases would die; they die from septic absorption. They have a quick pulse, coated tongue, but the temperature is not high. The condition is due to the reopening of the lumen of the appendix, which acts as a drainage-tube, allowing the pus to accumulate and flow back into the bowel. So in the Ochsner treatment, any man who uses it and fails to operate in the first two days takes greater chances than he should. This is the time when we are all agreed it is safe. I would not say that all get well, as I do not think we can do any apparently serious operation without having a death perhaps in one case out of three or four hundred. In this number we might get a death from pneumonia or some extraneous cause which is not due to the operation *per se*.

Dr. W. P. Carr, of Washington, D. C.—There are two or three points on which I wish to speak. First, as to the time of operation. If we could operate on all cases within the first thirty-

six hours the mortality would be very small. As Dr. Mayo has said, the operation is unquestionably much safer then. I have lost but one case where I have operated within the first thirty-six hours. I think without any regard to the condition in the abdomen, the length of time the disease has existed makes a great difference. I have several times found the appendix perforated within twelve hours after the first symptoms, and the abdomen filled with fecal matter and fluid from the bowel, not walled off at all by adhesions, because of the great rapidity with which the condition had taken place. I have been much surprised at the good results obtained in such cases. Several of them I thought at the time of the operation would certainly die, and yet they made good recoveries; but the same condition met with four or five days after the attack will terminate fatally. A point that has impressed me very much is, that without regard to the condition in the abdomen, an operation is very much safer in the first twenty-four hours, and even in the first thirty-six hours, after the attack begins. My advice whenever appendicitis is positively diagnosed is: operate within the first twenty-four or first thirty-six hours if possible. The only question about operation with me is in those cases that are seen later and are in a desperate condition, almost sure to die whether we operate or not. I think it is just such cases as these that have brought the operation into disrepute with the laity and to a considerable extent with the profession. When the pulse can hardly be felt—and I think more attention should be paid to the pulse than to any other one symptom; when the whole system is fighting the disease, which is not confined to the appendix, I have operated on cases like that, and found in some of them thrombosis of the mesenteric veins, and in some gangrene of the intestine of a very extensive area; in one case I found gangrene of both tubes and ovaries, the broad ligaments, top of the uterus, and of two or three feet of the bowel. If I had known there was such a condition as that existing, I should not have operated. However, we are going to meet cases like that in spite of everything. We may educate the community, but we cannot educate all patients, and some will refuse operation until they get into this desperate condition.

I have been much pleased with Ochsner's papers and his results, and I shall be tempted to try his method of treatment in these desperate cases where I think there is little hope of saving them by operation. They are likely to die either way, but Ochsner claims a much greater percentage of recoveries than we can hope from operation, and it is better to let them die without an operation than with it. By doing this we will be enabled to operate earlier on many other cases and save more in the end.

As to the incision, I do not think that the length of incision has much to do with the danger of the operation or with hernia. But I do think there is a great advantage in using the McBurney inci-

sion whenever it is possible to do so. I find I can use it much oftener than I did at first, and a great deal of room can be obtained through this incision, particularly if it is made a little higher than the usual point and a little farther from the median line. By doing so we can separate the muscles to a great extent. And we may always draw the cæcum and base of the appendix upward more easily than downward. I find that I can use the McBurney incision in most cases—probably three-fourths of all cases by attention to these details

Dr. W. D. Haggard, of Nashville.—I have been much pleased to see so much unanimity of feeling in regard to non-operative intervention in the delayed cases of appendicitis. The third and fourth-day cases, with big bellies, perhaps a generalized peritonitis, are likely to die if we operate on them. The rule to operate on all cases as soon as the diagnosis is made is an excellent one, provided the diagnosis can be made within the first few hours of the disease, certainly within the first forty-eight hours I should say, if called upon to speak by the clock. After that time I believe it is decidedly unwise to operate upon all cases as a routine. I think many of us in following that rule were led into error. That rule implies that it was the duty of the surgeon to extend operative relief to all cases irrespective of the period of the disease, its extent, or the condition of the patient. It took a long time to learn that the mortality was very high in the advanced cases. Many of us perhaps felt that our own high mortality was due largely to personal errors in technique, and we still persevered hoping to obtain the ideal results that more able and experienced surgeons were supposed to obtain by operation as soon as the diagnosis was made. But when the report from the Massachusetts General Hospital came out with an operative mortality of 22 per cent. in acute cases that had been delayed, it was a convincing argument and made the members of the profession realize that operation in this class of cases had a high death rate in the most experienced hands and that it was inherent and unavoidable

Dr. Cartledge, in a paper before this Association in this city three years ago, was one of the first to protest against operation as a routine in the third and fourth-day cases. Many men had also come to this conclusion, and when such cases were declined operation some of them were observed to recover from the apparently hopeless attack.

When Dr. Ochsner said that he had been able to save many of the cases without operation by instituting a certain line of treatment, particularly in those that declined operation, he gave us not only a rational explanation of the cases of recovery that everyone had witnessed, but a rational treatment for those cases that had passed the period of safe operating was laid down that I think has met with very general adoption.

I do not think it is expedient for the cause of surgery, or

for the surgeon, or for the patient, or for the particular community, to attempt to extend operative relief to desperate cases of appendicitis. When we see patients with this type of appendicitis die in a community, it means many deaths to others who ought to be operated on in the future, and who might otherwise have been operated on safely in the first few hours of the disease. I think we are very well agreed as to the starvation plan after the safe interval or golden opportunity has escaped. Fortunately, most surgeons have arrived at the point when they can say with a good deal of precision which cases will get well and which ones will not. I think most of us would operate on any case that has a reasonable opportunity to get well, but I do not think we should operate upon cases which experience teaches us have more chances without the operation than they have with it.

In reference to the paper of Dr. Brown regarding paresis of the intestine, I had to come to Atlanta to learn how to cure these cases without purgatives. It may be unknown to some of the members that Dr. Hardon, of this city, originated the alum enema for the treatment of postoperative peritonitis. I may say that it has been most satisfactory in my hands. Given a patient on the second or third day after operation, who has not had a bowel movement, who has a pulse of 120 to 140, with distended abdomen, constant regurgitation, with elevation of temperature, whom you feel is likely to die, if that patient is given an alum enema in fifteen minutes there will be usually a large, copious action with quantities of gas that will so relieve the intestines from distention that in cases not lethally toxic the paresis will be overcome. I hope Dr. Hardon will speak on that subject.

Dr. George W. Crile, of Cleveland.—I have listened to Dr. Stone's paper with a great deal of interest because the subject with which he deals is a neglected part of the appendicitis question. In 542 cases I have found 12 of the type he described, and in one of these 12 it was impossible to find macroscopically the lesion, appendicitis, although microscopically the case was proved to be such.

I recall a case in which the abscess pointed at the popliteal space. It was followed from the popliteal space along the surface of the psoas muscle, and found to extend past the kidney, becoming subphrenic.

In another case a retroperitoneal abscess which extended up behind the peritoneum, through the diaphragm, pushing back the pleura, requiring resection of the fourth rib to provide drainage.

Dr. Stone's statement that almost every case has one or more chills is a matter of great importance. These cases present a minimum of abdominal symptoms and a maximum of constitutional symptoms. My experience with cases of retroperitoneal infection, like that of Dr. Stone, has been unfortunate. In the

last six cases in which I made blood cultures I found there were septicæmias in four.

Dr. Stone.—Did you make blood cultures before or after operation, Dr. Crile?

Dr. Crile.—Before operation in four. When the blood cultures show a true septicæmia the case must be left to itself, as operative procedures will only do harm.

Dr. Henry T. Byford, of Chicago.—With regard to the diagnosis of the chronic class of cases that are sometimes confounded with salpingitis, Dr. Baldy gave one rule, and I have another one which is similar, and which has helped me out many times. If there is doubt in a case that is sent me, I try to see whether I can diagnose disease of the appendages or not. If I cannot diagnose sufficient disease of the appendages to account for the symptoms it is reasonably clear to me that the case is one of appendicitis. If I can diagnose salpingitis, I try to exclude other causes. That leaves a small proportion of doubtful cases in which usually both the appendix and right uterine appendages are affected. The symptoms and history aid in determining the importance of either.

With regard to immediate operation, no doubt these cases ought to be operated upon as soon as the diagnosis is made, if possible. After forty-eight hours we have another analogy with gynecology, and I do not intend to tell anybody what we should do, only to remind that in cases of diseased uterine appendages we have found out when we should as well as when we should not operate in acute cases. Conservative treatment will develop here; it will restrict operations and will overthrow the dictum that we should operate on all cases.

In the removal of the appendages I agree with Dr. Baldy that when we are operating for other intra-abdominal pathological conditions we should leave the appendix if it is normal. We know that the human alimentary canal is very often abnormal from the fact that nearly everybody has some disease due to improper diet. One man has gall-stones, another kidney-stones, another inflammation of the bowels, another inflammation of the stomach, and many have appendicitis. There is perhaps constant danger of appendicitis in the body; yet we should not, in my opinion, remove a healthy appendix every time we see it, on general principles. If we have collateral symptoms or find local conditions sufficient to justify us in removing this organ when we operate for other intra-abdominal lesions, it should be removed, otherwise not.

Dr. Virgil O. Hardon, of Atlanta, Georgia.—I do not propose to discuss the subject of appendicitis in its general aspects, because, like Dr. Byford, I am a gynecologist and see only a few of these cases as compared with the general surgeon. But I do wish to discuss Dr. Brown's paper with reference to intestinal paresis. I had already spoken on the use of the alum enema before this Association at the meeting held in Richmond, but there are some

members present who were not at that meeting. I hesitate to say too much regarding it, because a man who has introduced a new method is very apt to be overenthusiastic about it, yet I cannot help feeling that overenthusiasm is hardly possible with reference to alum enema. All of us who are doing abdominal surgery know just the class of cases that have been described by Dr. Brown; they are taken off the operating-table in good condition, possibly after a comparatively simple operation; the vomiting which we attribute to the ether does not cease at the end of six or eight or even twenty-four hours, or if it ceases it recurs again after thirty-six or forty-eight hours. There is distention of the abdomen, beginning gradually and then increasing more rapidly as it goes on; the pulse rises, becomes weaker; the temperature rises, and, to make a long story short, the patient goes on and dies unless we can establish intestinal peristalsis. If we can establish that, the patient gets well. The question is, How shall we accomplish it? Sometimes we can do it by the mouth, but in the majority of cases the regurgitant vomiting prevents the taking of purgatives and so that method is not available. Enemas of various agents have been used—ox-gall, glycerin, turpentine, and a great number of others that I might cite, and their number is the best evidence that no one of them is satisfactory. I maintain that in such cases, if we use the alum enema, we can save patients' lives in a very large proportion of cases. In my own experience I have never known it to fail. I have not had a single death accompanied by intestinal paresis after abdominal operation since I began to use the alum enema, ten years ago, and I do a sufficient amount of abdominal work to make my experience a basis for a reasonable conclusion.

I said I only did a small amount of appendicitis work as compared with the men who are doing general surgery. I began to operate for appendicitis after I commenced to use the alum enema, and I have been so fortunate as to have 100 per cent. of successes, and some of those patients were saved from death by the use of the alum enema. I am as certain of it as a man can be of anything connected with the practice of surgery. The alum enema consists simply of an ounce of powdered alum dissolved in a quart of warm water, and injected into the bowel. I have never seen it fail to set up peristaltic action. I use a long tube. I began using it simply like the ordinary form of enema, and got good results; but my assistants and nurses have taken up the use of the long tube, carrying it up above the sigmoid flexure, and I allow them to do so. But my experience does not show that any better results are obtained with the long tube than when the enema was thrown up as high as it can be thrown with the ordinary syringe. Peristaltic action is established in from fifteen to twenty minutes, with practically expulsion of all gas from the bowel. The peristaltic action set up by the alum enema is not limited to the large

intestine, but even extends to the small intestine, so that the bowel which is enormously distended, as it goes down, becomes as flat as that of a woman after confinement. It is astonishing to note the rapidity and completeness with which the gas escapes from the bowel.

There are some gentlemen here who have used alum enema, who have tested it thoroughly, and, in order that I may not be accused of overenthusiasm, I would be glad if some of these gentlemen would add their evidence to mine, and that of the Secretary, because I feel that in the alum enema we have a life-saving measure, one that will save many lives which would otherwise be sacrificed.

Dr. M. C. McGannon, of Nashville.—There are one or two points in connection with this subject to which I would like to make allusion. First, I desire to condemn the practice of the general practitioner, when called to see a case of appendicitis, in giving the patient a purgative. I think that is objectionable for several reasons. The first reason is that it produces delay in determining what is to be done with that particular case. It takes some time before the purgative will act, and of course the general practitioner has to wait until the effect of the medicine has been produced. In the second place, the purgative, be it violent or not, produces a certain loss of vitality or shock, and shock in these cases is not desirable, because we never know how severe a case of appendicitis may become and we should preserve the patient's vitality as much as possible. Another reason is that nature's plan of treatment in peritoneal inflammations is quietude. Nature prevents violent muscular action in all cases of injury, it matters not how produced, and the action of a purgative is to interfere with nature's plan

A word or two with reference to purgation before or after abdominal section. Patients for abdominal section have the bowels emptied as the result of the preparation for the operation, hence there is very little in the intestines to be cleared out by a purgative immediately following the operation. A purgative before operation or at any other time lowers the vitality of the patient; consequently after operation, at a time when we want the vital forces at the highest point, in order to combat any adverse influences that may exist, purgation must be harmful. It is sometimes argued that purgation is used for the purpose of draining the peritoneal cavity through the intestines. If this be true, then I contend it is unnecessary because we should make all the necessary preparations for draining the peritoneal cavity when a drain is found to be necessary. It is nature's plan to establish quietude after abdominal section, especially if there has been or is present an inflammatory condition; hence we should not interfere with nature's efforts by administering a purgative with the idea of having the bowels act soon after operation. It is in many cases

preferable to use opium or morphine to quiet them. My personal experience during the last two years has deepened my convictions against purgation after abdominal sections. In my private institution I have had more than 150 cases within the last two years without a death, and in none did I resort to purgation after operation. In all cases I either permitted nature to care for the bowels or resorted to late administration of laxatives. In not a few I employed morphine to produce quiet and relieve pain.

A word or two about the long rectal or colon tube. I have had a good deal of experience with nurses in the use of rectal tubes. Frequently I find a nurse using a long rectal tube, administering what she calls a "high enema." It is impossible to pass a long, soft rectal tube beyond the sigmoid flexure. With a patient in the knee-chest position, the proctoscope can be passed up about ten inches; but even through this tube in situ, the bowel being distended by atmospheric pressure due to the position of the patient, the soft colon tube cannot be made to pass up the normal colon. The peristaltic action of the gut will close its lumen to the soft instrument. It is an anatomical and physical impossibility to pass the soft colonic tube (the high-enema tube) through the normal sigmoid. Those of you who doubt this statement can easily prove it by a digital exploration of the rectum after the attempt has been made. The tube will be found coiled up in the rectum.

Dr. Charles L. Bonifield, of Cincinnati.—I did not hear the first two papers that were read, but I did hear the last one and a great deal of the discussion, and would like to make one or two remarks. I agree with Dr. Byford, that those of us who did gynecological surgery before we did surgery above the brim of the pelvis did not have to learn from our experience in operating for appendicitis that there is a time when many patients are much better off if let alone. I am very glad to see such unanimity of opinion as to the desirability of operating in the first twenty-four hours. The common knowledge of the profession to-day is always the knowledge of the public five years hence, so by and by we will get to operate on nearly all of these cases of appendicitis in the first twenty-four hours, and then appendicitis will not be the dreadful disease it is now. But after the first twenty-four hours there is a large number of cases which will go through if properly treated, and I thoroughly believe in the method used by Dr. Ochsner, namely, emptying the stomach and emptying the bowels, and thus stopping the peristalsis. But it is particularly the after-treatment of these cases I wish to speak about.

In the paper on that subject the essayist confused the results, to a certain extent, with the causes. I do not believe vomiting is the primary cause of death in these cases, although it may ultimately lead to that termination. But the vomiting is simply a symptom of sepsis and of distention of the bowels, and those of

us who watch the cases closely ourselves after we have operated on them would be hard to convince that free purgation does not add to the chances of the patient's recovery, and does not, at least, give them a great deal of comfort.

As to the giving of water after operation for the purpose of washing out the stomach, I believe thoroughly in washing out the stomach, but it should be done with a stomach-tube. Why? Simply because we can do it more effectually in a shorter time, and we do not get that reverse peristalsis started by which bile and the contents of the duodenum are carried back into the stomach, and vomiting is started which is hard to stop. Practically there is no way of stopping it except by starting peristalsis in the other way. I know many cases of abdominal surgery will get well without purgation, but it does seem to me a step backward to return to the routine administration of opium and stop peristalsis after operation. While the stopping of peristalsis after operation is bad, stopping it before operation is what we want. There is every reason why, if we are not going to operate, that infection should be limited to as small an area as possible; but if we have taken away the greater part of the infectious material, probably the peritoneum itself is able to take care of the remainder, provided it is in a healthy condition. Nothing so helps the peritoneum in its function of digesting or disposing of infection as emptying the intestinal tract. One gentleman spoke of the advantage of opening the bowels and letting off the gas, as is done in cattle. Veterinary surgeons do this in horses much more scientifically. They inject hypodermically eserine, which causes contraction of the muscular fibres of the intestinal coat and causes the gas to be expelled by the natural channel.

Dr. H. A. Royster, of Raleigh, N. C.—I wish to say in connection with the remarks made by Dr. Bonifield that I have used hyoscine hydrobromate in such cases as he has referred to, and have obtained gratifying results. I have in three desperate cases saved life by using 1-100 of a grain of hyoscine every hour, for three doses, without a single purgative. The obstruction of the bowels was relieved and all three patients recovered.

I feel rather diffident in speaking in the presence of so many distinguished authorities on any of these subjects, but I have had some experience in cases of appendicitis complicated with gynecological conditions. I have seen three cases of fibroid tumors of the uterus, in two of which there was pus in the appendix. In both of these the appendix was removed, in the other it was not. I have seen it involved in torsion of the ovarian pedicle; I have seen it involving a two months' pregnancy, and I have seen it adherent to a pregnant uterus at the fourth month, the operation being for appendicitis in this case. In one case the appendix was adherent to a normal ovary; it was an interval

case, and after its removal the patient, who had suffered from dysmenorrhœa for years, was entirely relieved.

I agree with Dr. Baldy in saying that the coexistence of pelvic disease and appendicitis is simply a coincidence, and that they have no causal relation to each other. I believe also with him that it is improper to remove the normal appendix, even though it is adherent, in these cases. I was very much interested in reading an article by Sajous on what he supposed is the function of the appendix, namely, secretory and absorptive. Whether his observations are true or not in regard to the functions of the appendix, he has given us suggestions which I think are wise. He considers that the removal of the normal appendix should never be undertaken, and cites numbers of cases in which normal appendices had been removed and the recovery was not as rapid and prompt as it was in those cases where the appendix was very much diseased.

I have treated two cases of appendicitis according to Dr. Morris' ideas of short incision and closure of the wound in pus cases. Both of these recovered, one of them having a small superficial abscess underneath the abdominal wall. I do not know whether I can agree exactly with Dr. Morris when he says that most surgeons begin with short incisions. Some time ago I was on a Pullman car with Dr. Charles W. Stiles, of Washington, who discovered the American hookworm. We were discussing appendicitis, when he pulled down his trousers and showed me a scar that was seven and a half inches long after contraction. His appendix was removed in the interval by Dr. Halsted, being the first of that class of operations done by that eminent surgeon. Dr. Halsted hesitated four weeks before he performed the operation. In fact, he did not want to operate. Now, when we come from that incision down to the one Dr. Morris makes, we can readily see that evolution has been the other way.

In the summer of 1900 I saw Sonnenberg perform five appendix operations in one morning. In one of them the incision was five inches long; in another it was thirteen inches. In the latter case the infection had extended up as far as the stomach wall. He made a short incision at almost an acute angle with that of his original incision, and opened up the whole belly. The patient recovered.

I have been impressed with the technique of Dr. Morris, but I have not been able to carry it out with the degree of perfection that he does. I agree with him that it is better, if possible, to fish the appendix out through a small incision and let the patient get well, than to make an incision sufficiently large for one to introduce his fist and run the chances of killing a patient or of producing hernia.

Dr. R. C. Persons, of Norfolk, Va.—It is not so much to take part in this discussion as to let your Association know something

of the surgical work along this line that we are doing in the navy at the present time; and it is especially of that in the hospital at Norfolk, of which I have the honor to be in charge, that I wish to speak. We have only had a limited experience there, necessarily, considering the small body of men we have in the navy, yet we have more or less appendicitis, but usually a less number of cases than we might have in the same number of men in outside localities, because our men are all selected and all forms of gastric disturbances they may have at the time they apply for enlistment are carefully inquired into, and the men so affected are consequently rejected. Of course, this eliminates a great number of hospital cases of appendicitis. In the last year we have had about thirty-five cases in the hospital. These have generally been cases in which the appendicitis was due to errors in diet, some having the catarrhal form of the disease. They have varied from the mildest cases up to some very severe ones, even to general peritonitis. In one of the cases there were quite large abscesses in various parts of the abdomen, metastases from the diseased appendix, which was in a gangrenous condition. We opened one abscess on the left side, and had to exsect a part of a rib in the right subdiaphragmatic space. This was the most severe case.

As to other causes, we have had foreign bodies in only three, two of them being fecal, and another an ordinary pin which the patient swallowed three years previously. This was found in the middle of the rather long appendix, in which suppuration had just begun. We cannot operate upon a man in the navy without his consent, unless it is a case of life or death. This man resisted operation, but finaly, when this severe attack came on, he consented, and as he was about to be transferred to a ship bound for a foreign station, it was a good thing for him that we found him, because there is no doubt he would have died without operation. It is almost impossible to operate at sea on a small vessel. As you may realize, the opportunity for obtaining assistance for an operation at sea is not good, and oftentimes the operator has no assistant, and he may have to depend entirely upon one nurse for all the assistance he has. The pin removed from the appendix I brought along, thinking possibly some of you may never have seen a pin in the appendix, and I think it is unique in that particular. As to the time of operation, we always operate as early as possible. All cases are operated on, and so far all have been successful. As to the method of operation, the incision is made as short as possible, but always as long as we think desirable. The wound is closed immediately, as a rule, but at times some drainage is instituted. We always assign the younger men to do the operations in selected cases, as they may be ordered to sea alone on a small vessel, and as they are just as apt to have cases of appendicitis we try to prepare them for

operating alone, and insist that each man shall operate on a certain number of cases in the hospital. Feelings of jealousy in regard to patients do not exist among medical officers of the navy, and all officers of a hospital or vessel should know all the cases accurately in each ward, as well as his own, so as to properly look after them in the absence of the regular ward officer. In our work we all are united and are jealous only for the good of the patient.

And not only in appendicitis, but we have a very good surgical clinic otherwise. We have a great many cases in which we do the Bassini for hernia, and for varicocele the Kocher high operation. As all men in the navy are liable to any accident our experiences are varied; I am glad to say that our results have always been excellent from operations. A great many of our men have come directly from under the eye and instruction of some of our most noted surgeons in the various hospitals throughout the country. They have been admirably equipped to help themselves along in their work by themselves, and the Surgeon-General has recently opened a medical school in Washington, where all the young men are given a five months' course in practical work before going to sea; and he has also established in the Norfolk Naval Hospital a training school for nurses. I have direct charge of that, and the material we get is very good and promising; whereas formerly we had to pick up seamen on deck to do nursing, now we have all the advantages of trained nurses.

It very often happens that the naval surgeon is able to give a great deal of help, not only to medical but to surgical cases, in the communities in which he visits. Especially is this the case in the islands of the East and far-away places where surgery cannot be had. In the South Sea, in the Philippines, in some portions of China and Japan, in South America, etc., many of our surgeons have done fine and efficient work, such as should commend them to the earnest consideration of the profession throughout the country. These men have always had uniformly good success, due largely to the training they have received in the good medical schools we have; and the outlook for the future is brighter than it has been in the past.

I am very much obliged to you, gentlemen, for all I have learned from you, and I assure you that the pleasure I have received in attending this meeting will always be a lasting memory.

Dr. Dean (closing the discussion on his part).—It was a dereliction on my part in not making my position in regard to operating for appendicitis clear. The real intent of the paper was to urge early operation in all cases, to operate on all cases, under all conditions where there was hope of success and at any period. We can tell very well the condition of a patient when we see him, examine his pulse, observe his facial expression, etc. The physiognomy of the patient tells me whether he is in a good

or bad condition. I think every man who has spoken has urged the following principles I have laid down, namely, to operate early, within the first twenty-four or thirty-six hours, or as soon after the case is accurately diagnosed as possible.

In regard to those patients who are sick for four or five days, I have never dodged them myself, believing it is unwise to do so. When we operate on patients who have had appendicitis for several days we run greater risk as to mortality, but it is none the less our duty to operate.

With reference to the site of incision mentioned by Dr. Baldy, in all cases in which we have septic peritonitis or recurrent attacks of appendicitis, we know that we have adhesions and other conditions to deal with that are outside of the appendix. It is therefore wise to make the incision in the median line, as we can thus more effectually deal with all the conditions that may be found in the abdomen or pelvis.

As to long or short incisions, I must confess that I do not favor long ones. I saw an incision not long since that was made for appendicitis, fourteen inches in length. The patient recovered, but, as Dr. Morris has said, a long incision makes a serious wound, and this makes the case more serious. A long incision will heal as readily as a short one, but the patient is more liable to have postoperative hernia, and for that reason long incisions should be avoided whenever possible. While I do not perform a great many operations, I have yet to see my first case of postoperative hernia.

With reference to purgation, I do not think a purgative which moves the bowels and expels the fecal matter and gas which have accumulated within the last twenty-four hours weakens the patient very much. I like to give it. I try to get the bowels thoroughly aseptic, then I can close them for a week or ten days if necessary. The condition of the patient afterward is comfortable. It is an advantage to give a purgative beforehand and have the bowels empty. This also prevents much nausea after operation.

I am much opposed to administering morphine before a diagnosis is made, for the reason that we lead the patient to think that he is going to get well without operation, and we thus lose much valuable time, and possibly the patient as well.

After operations I am much opposed to the giving of opium, as I do not think a patient usually needs anything. I put the patient on his back, keep him quiet, and in a few days he gets well without any trouble.

In regard to giving water, as advocated by Dr. Brown, I keep water out of my patients as much as I can. If I have a case of sepsis, I would rather give purgatives. A dry peritoneum will absorb a great deal, but when you have the bloodvessels, the lacteals, and absorbents full, it will not absorb so well.

Dr. Stone (closing the discussion on his part).—I should like to discuss all the papers that have been presented in this symposium, but time will not permit.

With reference to the paper of Dr. Baldy, I concur largely in what he has said. However, there are men of larger experience than most of us in this work who have placed themselves on record as believing that there is an association (communication by circulation) between the appendix and other organs in the pelvis. For instance, Dr. John B. Deaver has put himself on record as saying that there is a close association between the circulation of the appendix and that of the ovary. We should study the lymph circulation more carefully and closely than we have done heretofore, and by so doing I believe we will learn things of which at present we know very little.

With reference to Dr. Brown's paper, I feel very much inclined to tell what I just heard in a private conversation. I asked Dr. Byford what he did to his patients after operation that enabled so many of them to get well, and he replied, "I let them alone." I believe if I have learned anything about the after-treatment of laparotomy cases it is to let them very much alone. I do not like to hear anyone say that he resorts to a stereotyped after-treatment. A good surgeon ought to know, if he has done careful work in the abdomen, that the patient has no use for purgatives administered the next day after operation. Some have gone farther and have given purgatives an hour before the operation; they have filled the stomach with loathsome drugs to secure prompt peristalsis. Let that practice be eternally and forever condemned.

As to alum enema, I am frank to say that I rely upon enemas, whether they are of alum or not. I will give alum if I am obliged to do so. I would do something to persuade the bowels to act. I shall never forget that a large enema once had something to do with a fecal fistula which formed after an appendical operation performed by myself. That ought to remind us that we should not force material fluids past a weak point in the bowel which we have endeavored to close. Perhaps there was necrosis of the bowel at the time of the operation.

I think Dr. Brown ought to have a great deal of sympathy and encouragement because of his boldness in advocating that treatment to which he has referred, except the opium part of it. The most essential thing is to let these patients alone generally. We do not believe in feeding a patient who has reversed peristalsis either with calomel, castor oil, or anything else until the reversed action ceases. If you persuade the patient's bowels to act at the other end, you will get better results.

Dr. George J. Brown, of Birmingham, Ala. (closing).—The average time of operation after the onset in these cases was seven days, but through no choice of mine was it so long. As the rest

treatment will tide over many desperate cases without operation, my argument is that rest treatment is the proper one for those desperate cases that we do operate upon. It is no answer to say that we should not operate upon such bad cases because we cannot always tell how bad they are until the operation has been begun. I operated upon one patient who had been sick for thirty days with chills, vomiting, and fever, with pain and tenderness, and found that she had a catarrhal appendicitis with only slight adhesions and no pus. Another had been sick only fourteen hours and had a ruptured gangrenous appendix and a fatal sapræmia from the large quantity of fecal matter that had been poured out into the abdominal cavity.

In these severe cases after operation the patient either has a general peritonitis or he has not. Opium, lavage, the tight binder, and starvation and withholding purgatives are indicated because of the paralysis of the bowels which will be present with any marked degree of inflammation. Alum enemas, eserine, nor anything else will go through bowels that are paralyzed, any more than they will go through bowels that are mechanical, because the peristaltic movement is absolutely necessary for anything to pass. As nothing can go through below, the plain indication is to endeavor to keep the upper healthy portion as quiet as the paralyzed portion until the inflammation has sufficiently subsided to allow it to wake up. Efforts to compel it to wake up by the use of purgatives given too soon after operation may only excite the upper healthy portion to activity and result in regurgitant vomiting, with its train of evils. When purgatives go through, the patients get rapidly better, but they go through because the improvement has already begun, and they would probably move without purgatives a day or two later. When the bowels move they chiefly relieve the surgeon, the patient being already better.

SEPTIC THROMBOSIS OF THE FEMORAL VEIN FOLLOWING INFLUENZA.

By D. F. Talley, M.D.,
Birmingham, Ala.

The case I wish to report is one of septic thrombosis due, presumably, to a spell of influenza from which the patient was recovering when the phlebitic trouble arose. Before reporting this case I will quote from Finkler, in the *Twentieth Century Practice of Medicine*, the following: "The bloodvessels have been found greatly changed in influenza. On the part of the venous system, phlebitis and thrombosis frequently make their appearance during the period of convalescence. According to the report of the Collective Investigation Committee, disease of the femoral vein was, with few exceptions, present much more rarely than that of the anterior tibial and brachial. The cases were not often fatal; twice death was due to hemorrhagic infarction of the lung; in one instance it occurred as a result of amputation of the thigh for gangrene. It is very likely that the involvement of the veins of the lower extremities may be due to cardiac debility. Leichtenstern regards the fact that this change may be of a very acute character as a special peculiarity of this venous thrombosis. He reports a case of thrombosis of the veins of the arm occurring in a robust physician, and accompanying a severe cardiac influenza, which led to a marked swelling and a blue discoloration of the whole extremity within twenty-four hours. He refers to the fact that gangrene has been observed in cases of thrombosis of the veins to this obstruc-

tive change. As this occurs so very rarely, Litten believes that in a case reported by the collective investigation the gangrene of the thigh had probably been erroneously referred to a venous thrombosis. According to Leichtenstern, however, it is repeatedly mentioned in the history of the disease that the arteries are not occluded in these cases, but that, on the other hand, the venous thrombosis leads to grave changes in the extremity affected. We may mention an observation of Johannsen as belonging here, which relates to a thrombosis of the veins of the right arm and of the right lower extremity. At the amputation of the thigh for gangrene all of the veins were found to be filled with deeply extending, firm thrombosis ; the femoral artery, on the other hand, was the seat simply of atheromatous degeneration. In influenza we meet with a spontaneous thrombosis of the arteries such as has been regarded by Virchow as marantic, and which has been met with hitherto chiefly in the course of typhoid fever. One of the first cases of the kind is described by Leyden. It has its seat by preference in the popliteal artery, and makes its appearance most frequently during the period of convalescence. This accident leads to a grave condition of gangrene of the lower extremities, which has been described by Eichhorst, Gerhardt, and Cammerer, and which occurred not only in aged and decrepid individuals, but also in the young and robust. Occlusion of the arteries, like thrombosis of the veins, occurs symmetrically, involving the corresponding vessels on both sides. The symptoms of an arterial occlusion in influenza do not differ from those of a similar condition occurring at other times, and consist in a sensation of cold and anæsthesia of the extremities, absence of pulse beat, occasionally violent pains, bluish-black discoloration, and mummification of the parts involved. The prognosis is unfavorable, death occurring usually even after amputation. Septic symptoms of a general kind frequently make their appearance after arterial thrombosis. In the German collective investigation report eight cases of arte-

rial thrombosis are mentioned. Four of these were unilateral, involving the popliteal artery ; the fifth, which was also in the popliteal artery, was accompanied by symmetrical gangrene of both legs ; the sixth case was one of thrombosis of the femoral artery, with gangrene ; the seventh, thrombosis of the brachial artery, and the eighth of the cerebral arteries. In addition to this, occlusion of the arteries centralis retinæ and of the arteria fossæ Sylvii was observed, but the condition in these cases was due to an embolic closure of the vessels accompanying chronic endocarditis. As to the cause of these thromboses, we must, of course, bear in mind that in degenerative diseases of the cardiac muscle the formation of the thrombus occurs in the right as well as in the left ventricle, as has been frequently demonstrated post-mortem. Besides this, emboli will be disseminated by an acute or chronic endocarditis, or arteriosclerosis of the aorta may be the cause of the formation of thrombi.

In other cases the already existing senile changes will be so aggravated by the influenza that the formation of thrombi can take place. Primary or spontaneous arterial thrombosis is dependent, von Leyden is inclined to think, upon disintegration of the white blood elements ; this increases progressively from the commencement of the disease to the crisis, and also beyond. Thus we must place these thrombi formations in the line with the action of the blood-plaque thrombosis in various cases of poisoning (phosphorus, chlorate of potash) ; possibly an extraordinary spasm of the vessels may also play a role here, as is assumed by Gerhardt. This becomes plausible by the observations made on the spasmodic action of the peripheral bloodvessels, as described especially by Petrina, who noted the occurrence of temporary changes in temperature, from cold to warm of a finger or toe, in the course of influenza. The hemorrhagic symptoms in influenza, which are the evidence of intense impression of the poison of influenza on the bloodvessels, are in a high degree interesting. Attention has already

been drawn to hemorrhagic encephalitis in speaking of cerebral diseases ; large and small hemorrhages are of not very infrequent occurrence in this organ. But we also meet with a variety of hemorrhages in other parts. Pick has described a case which ran a rapid, short course under the picture of a hemorrhagic diathesis. Bleeding from the nose, chiefly in young individuals, has been frequently observed and described by Peiper ; in other recorded cases violent epistaxis has occurred only late in the course of influenza. The sputum frequently presents an admixture of blood in the shape of streaks and dots, and true hemorrhage of the lungs has not infrequently been observed, even in the absence of tuberculosis. I have seen violent attacks of hæmoptysis in some cases of chronic pneumonia, occurring at long intervals ; and in another case bronchial hemorrhage has now lasted about four years, almost without cessation. Hemorrhages into the skin in the form of petechiæ has been repeatedly described, and also hemorrhages of the tympanum, and the frequent admixtures of blood in the purulent exudation from the ear, are recorded. Brande mentions three cases in which such hemorrhages occurred in the absence of otitis media. Helling twice met with an initial hæmatemesis in cases in which no suspicion of gastric ulcer was present. Intestinal hemorrhages occurring in otherwise healthy individuals after an attack of influenza have also been reported. As a rule, these bloody evacuations continued for a few days, and were then followed by mucous stools. Keilmann and Dietrich described these in the gastric form of influenza. Cases of hemorrhage from the kidneys in the form of hæmaturia have been described by Eichhorst, or in the form of hæmoglobinuria by Baumler ; slighter admixtures of blood in the urine were found in some cases of nephritis. The menstrual flow during the attacks of influenza has in many instances been reported to be more violent than usual and of longer duration. Haken observed violent metrorrhagia in certain cases in which no tendency to hemorrhages of this sort had been

formerly present, and Helling observed in a woman, aged forty-nine years, who had ceased to menstruate for five years, and who had no uterine disease, a hemorrhage from the uterus during an attack of influenza.

In the same work Sansom has the following to say concerning influenza as a cause of phlebitis: inflammation of the veins arises in the course of some infectious diseases.

This is all that can be positively asserted about the relation which the phlebitis bears to the original disease. Proof is wanting of its being a direct result in the system of the action of the specific poison whose general effect gives the name to the original disease. But, on the other hand, it has never been proved that it is due to any diverse or even secondary infection. For the purposes of clinical comprehension, it is best to consider it *a specific inflammation arising in the course of infectious diseases, and probably caused by the same morbid agency as the general disease in which it is encountered.* In most infectious diseases it is possible to meet with phlebitis, but it is only necessary to select a few of these for clinical study. This form of phlebitis is only too often observed in epidemics of influenza. It is sometimes, only rarely, though, met with in sporadic cases, a fact which would seem to show that a certain amount of virulence in the poison is a necessary factor. In the severer cases which occur in epidemics the phlebitis appears just when the temperature tends to become normal. Other complications, such as otitis, endocarditis, or nephritis, may have preceded it. The pulmonary complications seem to be those which are particularly favorable to the production of phlebitis. Bronchitis and bronchopneumonia appear most prone to cause this further complication in influenza. In these cases it is when convalescence has set in the phlebitis appears. It most often attacks the lower limbs and undergoes rapid evolution. The pain is severe, but disappears comparatively quickly.

The œdema is marked and rapidly mounts the limb, all the indications pointing to an early venous obliteration.

The inflammation has little tendency to affect both limbs; when it does so, the second outbreak is benign in character. When once the veins have become affected the disease seems to lose its virulence; both the local and the general symptoms seem to be checked. Very rarely is this phlebitis followed by fatal morbid phenomena. If the influenza be mild, as in sporadic cases, the phlebitis, when it occurs, is also mild. In such cases it generally attacks the calf and saphena vein and disappears comparatively soon.

One peculiarity of the phlebitis of influenza is its proneness to spread in the organism in patients already the subjects of other debilitating diseases. Cancerous cachectics, chlorotics, and consumptives exhibit this peculiarity of the disease. Influenza is also specially prone to reawaken neuralgic pains suffered in times past by patients who have had some other form of inflammation of the veins. In influenza the pains recur with pronounced neuralgic character. But this may be the extent of the venous mischief, not amounting to true phlebitis, for the symptoms disappear as soon as the influenza is cured. In general, the large veins are the ones that are attacked in influenza, and consequently the pathological sequelæ are often persistent and troublesome. They are rarely fatal, and embolism is the exception; the reason of this may be that, when the large veins are thus attacked, more care and attention are bestowed on the cases, as the symptoms are more grave.

Miss M. B., single, aged thirty-one years, by occupation a nurse, had been in good health for the past eleven years; had typhoid fever when twenty-five years of age, but no phlebitis following. Was sick three weeks with influenza before any sign of phlebitis arose. The temperature during the attack of influenza went to 104.5° F., showing an intense infection. She had severe pain in left side of chest one week before phlebitis came on, and when the latter occurred the chest pain was relieved. The first pain she had with the phlebitis was in the region of the psoas muscle; it then extended down the thigh, and the leg and

thigh commenced to swell. Soon after this she commenced to have hard and irregular chills, with very high temperature after every chill. She went on in this way for a week before I saw her, when Dr. H. L. Martin sent her to the infirmary for an operation. When I first saw her she complained of great pain in the region of the psoas and iliacus muscles; there was considerable swelling of the thigh, and marked induration and tenderness along the femoral vessels; there was also discoloration which was of a dark or venous color. The case at first impressed me as being a psoas abscess pointing to Scarpa's triangle, although Dr. Martin had already made the diagnosis of phlebitis. I watched her closely for four days after she entered the infirmary before I decided to operate. During this time she had one or two chills daily, with a sharp rise of temperature to 104° or 105° F., with marked signs of prostration. After watching her for three days I decided that it was a case of septic phlebitis, and determined to operate the next morning; at this time the venous discoloration was quite marked; she was getting very weak; all her secretions were sluggish, tongue badly coated, and every indication pointed to an early death unless she was relieved of the source of poison.

On the morning of the operation, while she was being prepared for the operating-table, she had the hardest chill as yet, and her temperature went to 106° F. The case appeared so urgent that I did not think it wise to delay the operation, so she was put on the table and operated on while her temperature was 106° F. in the flexure of the elbow, which means that her actual temperature was at least 107° F. I cut down over the femoral vein, and expected to find pus there under the deep fascia around the femoral vessels. After going through this fascia and exploring thoroughly, no pus was found. I then decided that all the trouble must be in the femoral vein, so I dissected it out, and just at the entrance of the long saphenous I found evidences of a clot; the saphenous was ligated and

cut loose from the femoral, and the contents of the femoral examined through the saphenous mouth ; the femoral was found completely filled and occluded with a rather firm, grayish, dirty clot. I then slit the femoral up to and a little under Poupart's ligament, and removed the clot and ligated with chromic catgut above the slit; the vein was then slit for three inches below the entrance of the long saphenous, and the clot removed ; a long probe was then passed down the vein for at least six inches, but the thrombus extended farther, and not a drop of blood came through after removing the probe; the vessel at this end of the slit was then ligated, and the wound irrigated and packed with sterile gauze wrung out of hot carbolized solution. In two hours and a half after the operation the temperature had gone down to normal, a fall of $7\frac{1}{2}°$ F. This sudden fall was rather alarming; but, as the patient's general condition seemed to be getting better, there were good hopes for reaction. The limb was elevated and surrounded with blankets and hot bottles, and her whole limb was kept perfectly warm for two weeks. There was no sensation in the foot and for some distance above the ankle after the operation, and in a few days the toes began to shrivel and take on a dusky hue ; there were three or four spots on the foot that commenced turning black, and I feared that gangrene was setting in that would take in the whole limb; however, in a few days a line of demarcation formed about these spots, and then I felt some hopes, for the first time, that most of the limb would be saved. After the operation the patient did nicely, and her temperature remained about normal until the third day, when she had a chill, and her temperature went to 103° F. I thought then the small portion of clot left between the ligature and the external iliac vein was giving trouble, but she soon recovered from the chill and had no further evidence of the infection. My treatment in this case and the result, so far as I can learn, are entirely unique. Very little is found in surgery as to treatment in septic phlebitis outside of opening the abscess,

which is usually caused by the infection. In Dennis' *System of Surgery* I find the following on treatment: "In case the superficial vein is involved the prevention of septic infection and the dangers of emboli can be averted by an operation suggested by Dr. Lea, in which a needle is passed beneath the vein above and below the thrombus, and the vein divided. If the deep veins are involved and the septic thrombus is causing the symptoms of pyæmia, amputation above the inflamed area is indicated to save life. The operation to be successful must be performed early, before the constitutional symptoms are well marked, and with every possible antiseptic precaution. Fortunately, such an emergency seldom arises." The incision in the thigh became healthy in about ten days after the operation and commenced filling with healthy granulations, and was entirely healed in a few weeks. The gangrenous tissue of the foot sloughed out, and the resulting ulcers healed slowly. The great toe had to be removed, but a useful foot was left. The patient left the city for her home in the country in April, about ten weeks after the operation.

I had a Mr. Hall, of the Surgeon-General's office, to prepare a bibliography of diseases of the veins, and he found only two reports of thrombosis of the femoral vein due to influenza, and the involvement of the vein occurred very much in the same manner as in the case I report. Of these two cases, one is reported by Kozlovski in the *St. Petersburg Gazette*, which was translated for me by a Russian scholar, in Washington, as follows: Peasant woman, aged forty-eight years; cook. Of healthy family; fifteen years previously had a baby at term; no abortions. August, 1897, she had erysipelas of the face, otherwise in good health, and remembers no disease. She was treated in Aleksandrovski Hospital for the erysipelas. Present disease appeared four days after patient was discharged from the hospital. Symptoms were: fever, general weakness, headache, vertigo, anorexia, catarrh, cough, this was dry at first, later accompanied by small quantity of mucopuru-

lent sputum ; later, blood appeared in it. Present condition, September 22d : Fever ; body normal ; skin dry and hot ; no eruption. Lymphatic glands not much enlarged. Tongue coated, milky and moist. Fauces : considerable spotted hyperæmia. Lungs : slight dulness of percussion sound in right middle axillary line below seventh rib ; breathing vesicular, somewhat metallic. Heart normal, sounds somewhat dull. Abdomen somewhat tympanitic ; somewhat painful to pressure along colon ; no appetite. Stools regular. Liver protrudes somewhat below false ribs; no pain. Spleen not enlarged. Sexual organs : left ovary somewhat enlarged. Urine : acidulous reaction ; specific gravity, 1010 ; straw-colored, no sugar, albumin, or cylinders ; 2 P.M., temperature, 37.3° C. ; at 6 P.M., 38° C. ; pulse, 100 ; respiration, 24.

September 23*d* to 25*th*. Temperature varies between 37.2° and 37.4° C. ; pulse varies between 96 and 92. Lungs : slight dulness on the left, below, behind, and on the side ; weakened vesicular breathing, crepitant rales.

24*th*. Bronchial breathing. Cough, small quantities of sputum, mucopurulent, at times bloody ; stabbing pains in left side. Abdominal symptoms gradually diminished and vanished on the 25th. On the 23d search for tubercle bacilli negative.

26*th* to 28*th*. All symptoms ameliorated ; appetite. Lungs, nothing abnormal. Stitch in the side continued. Temperature varies, 36.4° C. to 37.4° C.

29*th*. Twenty-sixth day of the disease. Temperature, 37.4° to 37° C. ; pulse, 88. Right lower extremity in region of gastrocnemii muscle increased in size, pain (stabbing) ; movement in knee-joint painful and difficult ; skin in affected region livid ; in popliteal region is felt through the skin a hard cord, very painful to touch ; no œdema of leg ; no pain on left side ; gastrointestinal functions normal.

30*th*. Swelling descended almost over the entire leg ; no œdema.

October 1*st.* Swelling enlarged ; no œdema.

2*d.* In addition, small subcutaneous hemorrhages in the lower portion of the popliteal region.

3*d.* Swelling extended up the thigh, so that the entire right leg is involved ; movements painful and difficult ; skin over the entire extremity very livid ; under Poupart's ligament a hard cord is felt, painful to touch ; no œdema observed. Pain considerable over the entire leg.

7*th* to 19*th.* The swelling gradually reduced, and on the 18th to 19th the increase in size is considerable ; no œdema at any time. At the same time, almost under the eye of the observer, were developed the skin veins of the extremity. Gradually the symptoms improved.

8*th* to 18*th.* Was observed an inconsiderable eczema resulting from external treatment of gray mercury ointment and warm compresses. Temperature varies from 37° to 36.2°C.

20*th* to 30*th.* Patient gradually began to stand, then walk on right foot, at first with outside help, then without it. At first patient felt pain, which gradually decreased. Patient could walk unassisted and without pain. Temperature varies between 36° C. and 37° C.

31*st.* Patient discharged from hospital (Mariinski) on request. Not seen again after that.

Treatment consisted of absolute rest, leg raised, warm (boric) compresses, following preliminary smearing (not rubbing) with gray mercury ointment, etc.

So that in this case we see venous thrombosis developing after influenza and involving all deep veins of the right lower extremity, sparing not even the femoral veins. This thrombosis appeared on the twenty-sixth day of the disease, when there was already improvement. Thrombosis developed on the twenty-sixth to the thirty-second day of the disease. The temperature did not markedly increase, but on the fifth day it reached 38.2° C. Reverse development began on the ninth day of thrombosis.

The other is reported by E. Leyden as follows : Last year I gave in these annals a treatise on arterial thrombosis

following influenza. In the following short communication I intend to complete the history of vascular obstructions following influenza. Though now this remarkable disease has been withdrawn from our immediate inquiry, it can still claim so much of our attention as to make a completion of its pathology desirable. Indeed, this pathology is almost inexhaustible on account of the numerous complications and sequelæ.

The venous troubles following influenza have excited less interest than the arterial thrombosis, because they are less important and less dangerous. The extensive, deleterious consequences of arterial obstruction, which in general are much rarer than venous thrombosis, impart to them a special importance.

The venous thromboses have been less observed, but they have found more attention in France, as I learn from a thesis by Dr. Chaudet. I shall first mention a case of my own at the first medical clinic (Charité Hospital).

Bertha R., a servant girl, aged twenty-two years, was received on January 16, 1893, at the first medical clinic, and left the institution, cured, on March 20th.

Diagnosis. Influenza. Venous thrombosis of the left femoral vein.

Anamnesis. Patient fell sick on January 13th, in the evening, feeling suddenly cutting pains on the left side of the chest. The sputum looked brown. As she grew worse she came to the Charité Hospital.

Examination. Patient is a young lady of strong build and well nourished. Face very much flushed. Complains of cutting pains in the chest, but does not make the impression of a serious disease. An examination of the lungs gives the following result: on the left side, behind and far down a moderate dulness of a hand's breadth; auscultation gives, with a deep inspiration, friction rales; breath sounds diminished.

January 16th. Temperature, 38° C.; pulse, 120; respiration, 30. Urine dark, little albumin, no diazo reaction.

Therapy. A mixture with acid hydrochlorate.

20*th.* Morning temperature, 37.5° C.; evening, 37.7° C.; pulse 104.

26*th.* Morning temperature, 36.7° C.; evening, 37.7° C.; pulse 89.

26*th.* Patient is pale and somewhat cyanosed; she complains of cramps in the left foot, so that she can move only with great pain. The whole left foot looks larger than the right one; the skin is tense, œdematous, and a little cyanosed. The abdomen seems a little enlarged, but nowhere sensitive. The pulse of the femoral artery is distinctly felt on both sides; but in the inguinal region a venous thrombosis can be felt, which extends upward beyond the ligamentum Poupartii and is tender to the touch. Warm compresses; at night sulphonal.

29*th.* Morning temperature, 38° C.; evening, 38.7° C.; morning pulse, 92; evening, 100. Moderate pain below Poupart's ligament; pressure on the femoral vein less painful; œdema of the left lower leg. Expectoration scant, mucopurulent. On examination no influenza bacilli. Urine 200; specific gravity, 1030; no albumin.

31*st.* Morning temperature, 36.9° C.; evening, 36.5° C.; pulse, 92. Skin and conjunctivæ are slightly icteric; liver not enlarged nor tender. In the urine neither bile pigment nor albumin. Œdema of the left lower leg still present. The thrombic venous cord above Poupart's ligament can still be distinctly felt, less so below Poupart's ligament.

February 3*d.* Morning temperature, 36.8° C.; evening, 37.4° C.; pulse, 100. The œdema of the left leg has decreased, but patient still complains of pain in it.

7*th.* The œdema of the left leg has decreased. The venous cord is still present, but not painful.

10*th.* Resistency above Poupart's ligament has decreased. The œdema has almost disappeared. Steady improvement and final cure.

Epicritical Remarks. As the disease occurred just in the midst of a violent influenza epidemic, and its rise

corresponded throughout (fever, affection of the lungs, prostration) with the picture of influenza, this diagnosis is sufficiently confirmed. The venous thrombosis began on the fourteenth day of the disease, where a marantic state of the patient was impossible ; besides, it began with renewed fever, which lasted four days, ended with crisis, and was throughout like an influenza fever. The thrombosis of the femoral vein could therefore not be interpreted as a marantic thrombosis, but as a new after disease (sequela), which appeared under new febrile symptoms. The symptoms were clear, characteristic, but not severe, the disappearance of the thrombosis was favorable and relatively quick.

The origin of the thrombosis cannot be ascribed to marasmus. I therefore think it can be explained in a similar manner as I have done in arterial thrombosis. " It is very easily possible to connect the remarkable phenomenon with the degeneration of the white cells of the blood, which increase from the beginning of the disease up to the fever crisis, and even after it, and then furnish extensive products of degeneration." (Blood-plaque thrombosis.)

The symptoms have been well described in the above-mentioned work. (Chaudet.) Professor Litten (cited in Chaudet's thesis) says (page 85) : " In the venous system we meet phlebitis and thrombosis frequently during reconvalescence. With few exceptions it is the femoral vein, rarer the tibial or cervicobrachial. I have collected twenty-five cases, but without special data of their course. Three cases ended fatally : twice on account of hemorrhagic infarct of the lung, once on account of gangrene of the thigh, with amputation ; but I think that in this case it was not a thrombosis of the vein, but of the femoral artery, as venous obstruction scarcely ever leads to gangrene of an extremity."

In the French monograph on influenza by F. Teissier (Paris, 1893), the venous thrombosis is described in detail ; page 117 says : Influenza phlebitis is not at all rare. Besides the cases described abroad, I can mention five

cases of my own. In two cases there was a bilateral phlebitis of the lower extremities ; in both cases the venous thrombosis resulted from an influenza pneumonia. One of the patients (female) was especially interesting, her condition very serious. Both lower extremities were enormously œdematous, pale, and painful, just like phlegmasia alba dolens. As there existed at the same time albuminuria and an affection of the myocardium, which showed itself by irregularity and feebleness of the pulse and attacks of syncope, the diagnosis for a time remained undecided between a myocarditis and Bright's disease. But recovery followed after two months under the influence of rest, tonics, and especially of subcutaneous injections of caffeine.

At the close I add an interesting case of Dr. Orloados in Athens (in *Progrès medicale*, 1890, p. 158) :

S. K. fell sick on December 14, 1891, from exposure to cold, general malaise, weakness, and anorexia at the same time, with coryza, facial neuralgia, which troubled him for eight days. A few days later, when the patient was already quite well, he felt, on coming home in the evening, an intercostal neuralgia, then felt chilly and cutting pains at the base of the right lung, accompanied with slight cough ; a pneumonia resulted, which lasted eight days. During convalescence the patient suddenly felt severe pains, which extended the whole length of the right lower extremity ; it was at the same time covered with numerous hemorrhagic spots of very livid hue, especially on the inner side. Three days later it swelled up enormously, and could not bear the least touch, especially in the direction of the saphenous and the crural veins. At the same time numerous vesicles appeared, and the swelling extended up to the hip ; fever moderate.

In the night of June 15th patient suddenly awoke with a sensation of great distress and orthopnœa, feeble pulse, and general failing. By repeated injections of camphor, she was brought to again. On the next day had violent fever, cough, and expectoration.

June 24th the phenomena of a very painful neuritis were found. On February 1st the left hip swelled up like the right one. To this was added, to complete the unfortunate circumstances, a phlebitis of the right basilic vein. This multiple phlebitis and the emboli greatly weakened the patient.

Twenty days later the symptoms had abated and the patient began to recover; only the swelling of the feet and the subcutaneous spots remained, and did not disappear until the patient went up and down stairs.

My case was much more intensely poisoned than any of the above-reported cases, and would have died in a short time had this septic clot not been removed. Unfortunately, the clinical charts of this case were lost, and I cannot give an accurate and detailed history of temperature and pulse during her convalescence.

DISCUSSION.

Dr. George S. Brown, of Birmingham, Ala.—I regret very much that most of the prominent gynecologists have left the hall, because it would be edifying to have them explain to us this mild form of septic thrombosis of the veins, such as we get sometimes in cases after abdominal section. Dr. Kelly in his book reports nine cases out of some two thousand operations, the thrombosis occurring on the eighteenth or twentieth day after operation; the patients got well by resolution. He did not explain them.

I have had one case which followed the course that Dr. Talley's case did, and it was supposed to be a mild form of infection.

Dr. Talley (closing).—Considering the intensity of the infection I had in this case, it would be very unusual not to find some pyæmic condition. All the infection that this patient was getting was being absorbed from the septic thrombus. I am very sorry that I did not find out what form of infection it was. I asked the nurse to preserve the clot for me, but she put it in alcohol and I could not tell anything about it. I lost the clinical chart that accompanied this case. However, that is not so very important. The patient had a chill about the third day after operation. The temperature was 107½° when I operated, and two and a half hours after the removal of the clot it was normal. On the third day she had another chill, temperature going up to 103°. I thought the clot next to the external iliac vein would give me trouble, but she reacted from this very nicely, went on and made a good recovery, with practically a normal temperature after this time.

CASES OF INTESTINAL OBSTRUCTION TREATED BY RESECTION, WITH RECOVERY.

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The following cases, three in number, of successful resection of intestine for obstruction due to grangrenous umbilical hernia, volvulus, and intussusception, respectively, are presented briefly as a contribution to the statistics of an operation the mortality of which is very high. They are the only cases of their several kinds upon which I have had occasion to do this particular operation.

Case I. *Large sloughing umbilical hernia; resection; recovery.*—Mrs. B. B., aged fifty-five years; very stout; old incarcerated umbilical hernia, which had been producing acute symptoms for five days. Operation immediately after admission to City Hospital, February 15, 1895, assisted by Dr. C. J. Montgomery.

A long incision was made in the median line through the skin and subcutaneous fat. The latter, which was about three inches thick, was found to be infiltrated with pus and permeated by sloughing masses which extended far under the skin in various directions. Before opening the sac, the necrotic fat was cut away as far as practicable, laying bare the surface of the aponeurosis for several inches around the ring. Gauze was tucked into the cavities left by removal of the sloughs and laid over the adjoining wound surfaces and the aponeurosis. The sac was then opened. Its contents consisted of an immense mass of sloughing omentum, adherent to the sac in many places, and overlying a moderate

coil of gangrenous intestine, the whole lying in a pool of pus.

The pus was sponged away, the adhesions of omentum to sac severed, and the greater part of the omental slough cut away to get more space for manipulation. The constricting ring was then incised, the coil of intestine walled off with gauze, and the omentum drawn out sufficiently to permit its ligation through healthy tissue, and ligated with catgut. Then the adhesions between the intestine and the margin of the ring were broken up, the intestine drawn out sufficiently, and the gangrenous portion resected. End-to-end anastomosis was made with the Murphy button. The sac was now cut away.

After a thorough mopping with 1:1000 bichloride solution followed with salt solution, the anastomosed coil and omental stump were returned to the abdominal cavity. The ring was closed with heavy silkworm-gut sutures except at its upper part, where a gauze drain was introduced. The wound was packed with iodoform gauze, and gauze drains were placed in the cavities left after removal of the sloughing subcutaneous fat, their ends being brought out through appropriate distal incisions. 1:1000 bichloride of mercury solution was used liberally throughout the operation, and, before closing it, the abdominal cavity was cautiously flushed with a 1:6000 solution of the same salt, followed with normal salt solution.

The patient left the table in fair condition, all things considered, and slowly improved until the tenth day. On the morning of this day the button was passed at stool. Some two or three hours later patient had a chill with rapidly developed extreme prostration.

After waiting until afternoon, when she had rallied somewhat, she was taken to the operating-room, the silkworm-gut sutures removed, and the margins of the hernial ring separated. The intestines were firmly matted together by adhesions. Upon separating them a considerable quantity of turbid serum escaped. Upon introducing a finger it was

found that the serum came from a sac formed, apparently, in the neighborhood of the anastomosed bowel. Whether there had been any leakage at the seat of the anastomosis or not could not be determined; but it seemed unlikely. A drainage-tube was introduced, the edges of the ring again brought together and the wound repacked.

Dr. Montgomery conducted the after-treatment. The patient slowly recovered from her prostration, and from that time her convalescence was uninterrupted. Later, the granulating surfaces of the wound were approximated by a few skin sutures which materially shortened the period of healing. The amount of intestine removed was sixteen inches. Dismissed from hospital March 20, 1895.

Considering her bad general condition consequent upon delay, and the very unfavorable state of the field of operation, it is remarkable that this patient survived.

CASE II. *Intestinal obstruction by strangulated inguinal hernia and volvulus; excision of fifty-six inches of small intestine; recovery.*—L. L., aged about twenty-five years, negro, was brought into the Lamar Hospital late at night with strangulated right scrotal hernia. History was not satisfactory, but it was to the effect that the hernia had been down about twenty-four hours. Had some pain and vomiting; pulse and temperature approximately normal; general condition good. Symptoms not being urgent, ice applications were made during the night. Was operated upon the following morning, October 28, 1901, assisted by Dr. W. H. Goodrich.

Upon opening the hernial sac, which was of moderately large size, it was found that the contained intestine was black and evidently beyond recovery. The ring was enlarged by a small incision and the intestine pulled down, with a view to resection and anastomosis. It was then discovered that the intestine which was drawn out of the abdominal cavity was in precisely the same condition as that in the hernia.

Thereupon, the abdomen was opened by a longitudinal incision through the right rectus near its outer border. The

abdominal cavity contained a considerable quantity of dark, bloody, and very offensive serum; all the intestine in sight seemed to be black, and the mesenteric veins were filled with thrombi. The condition was due to the occurrence of volvulus of the small intestine. The location of the twist was about three inches from the ileocæcal juncture. The involved gut was resected, end-to-end anastomosis made with the Murphy button, and the abdominal cavity washed out with normal salt solution.

The wound was left open and packed with gauze, and a large gauze drain was passed down to the seat of the anastomosis. Shortly after the operation patient developed symptoms of profound sepsis; the wound surfaces became necrotic, and diarrhœa supervened.

He was treated with frequent subcutaneous injections of normal salt solution, quinine freely (hypodermically), and, later, tartrate of iron and potassium in liberal doses. Locally, peroxide of hydrogen and balsam of Peru were used freely. Fortunately, the stomach was retentive.

Convalescence was very slow, in part due to extensive subcutaneous abscesses which developed at the seat of the injections of the salt solution. The wound closed by granulation. Six months later I heard of him as working as a day laborer on a railroad. The length of intestine resected was fifty-six inches. The button was not recovered.

Attention is called to the use in this case of quinine, hypodermically, in large doses, and tartrate of iron and potassium. My experience with quinine, given hypodermically, in doses of five to ten grains of the bimuriate every four hours, has been very satisfactory in acute septic conditions.

Stille long ago declared tartrate of iron and potassium to be a specific for phagedæna, and in this case a prompt improvement in the appearance of the wound surface was noted after its administration was begun.

This case is unique, so far as I know, in that the strangulated loop of intestine in the hernia was a part of a greater segment which had been strangulated by volvulus. It is

likely that the descent of the herniated coil took place shortly after the occurrence of the volvulus, and its strangulation was occasioned by the congestion which followed the latter.

C. L. Gibson, writing upon the results of operative treatment of intestinal obstruction, said "There is only one record of successful resection of the small intestine for volvulus, 127 centimetres on the second day of obstruction (Riedel)" (*Annals of Surgery*, October, 1900, p. 505). Examination of literature since then, while not exhaustive, has not discovered the record of another case. It is probable, therefore, that this is the second instance only in which a patient has survived this formidable though unavoidable procedure. Moreover, it is practically certain that in this case the operation was done not earlier than the third day of obstruction.

Case III. *Intussusception of small intestine; gangrene; resection; recovery.*—C. A., colored, female, aged about thirty-five years, was brought into the Lamar Hospital with symptoms of acute intestinal obstruction. General condition poor; patient thin and badly nourished; abdomen distended. Operation, April 19, 1902, assisted by Dr. R. V. Lamar. Upon opening the abdomen it was found that the obstruction was caused by an intussusception of the small intestine. The surface of the intussuscipiens was dotted here and there with necrotic patches, and one of these involved a considerable part of the mesentery. The whole mass was resected, and the ends of the gut united with a Murphy button. Not being perfectly satisfied with the approximation, I covered the line of union, for greater security, with an omental graft. The abdomen was mopped with peroxide of hydrogen in the neighborhood of the anastomosis, and the wound closed without drainage. Recovery was entirely uneventful. The button was passed on the seventeenth day. It was estimated that the length of intestine resected was between thirty and forty inches.

Gibson (*loc. cit.*) gives the general mortality of resection for intussusception as 81 per cent., and states further in this

connection that "only one case of resection for gangrenous intestine was saved."

The almost invariable fatality that attends operation under these conditions he attributes to the toxæmia that is induced by gangrene of the intussusceptum. In the case, however, which I have briefly outlined, in spite of the unmistakably gangrenous patches upon the intussuscipiens and involving even the mesentery, the patient, though far from being in satisfactory condition, stood the operation fairly well, rallied promptly from the depression which attended it, and recovered without interruption.

FIVE RECENT SUCCESSFUL LAPAROTOMIES FOR GUNSHOT WOUNDS OF ABDOMINAL VISCERA, INCLUDING ONE WITH TWENTY-EIGHT PERFORATIONS OF INTESTINES AND MESENTERY.

By Robert W. Johnson, A.B., M.D.,
Baltimore, Md.

There are certain operations, as hysterectomy and the removal of the Gasserian ganglion, that will always greatly excite the admiration of the surgical spectator, as well as give a sense of *bien d'être* to the operator, if successful; but I know no operation more a touchstone of a surgeon's capacity, as far as judgment and technique go, than laparotomy for wounds of the abdominal viscera.

In the ordinary removal of tumor or tubes, etc., the surgeon makes or controls the conditions; he chooses his time, place, and incision, but deals in the main with aseptic tissue or sepsis so hedged about by nature's prophylaxis that his wound is clean. Not so with traumatism. The vulnerating body is dirty; the clothes it passes through and perhaps transports are dirty; some ignorant bystander, professional or lay, sticks in his dirty finger or equally dirty rag to stop the blood. The viscera themselves, when perforated, often flood the cavity of the abdomen with the worst kind of infection, and when we have to deal with gangrenous gut, the abdomen is virtually a Pandora's box that we open, not to let disease escape for others, but to remove it from the unfortunate owner.

The cases which I wish to present have all occurred within the last five months, and represent a more or less typical experience that the surgeons of our own hospitals are meeting with from time to time with results more or less successful than my own.

Taking the cases in the order of their severity from above downward, the first one I call your attention to is:

CASE I. *Gunshot wound of stomach and liver; laparotomy; recovery.*—Florence G., mulatto, aged eighteen years, was shot by her husband (Case IV.) about 10 A.M. The police patrol brought her three miles over the rough pavements, reaching the hospital about 11, just as I reached there myself. On examination I found a ball, 0.32 calibre, had penetrated her abdomen near the median line. There was a second pistol wound in the upper and outer side of the right thigh, which was washed superficially with H_2O_2, not probed and dressed antiseptically. Her belly was scrubbed after the anæsthetic, the wound washed out with H_2O_2, and an incision, passing through the wound, made into the abdominal cavity. Taking out the stomach, I found the ball had ploughed its way through the great curvature, slitting the stomach, and opening it for about two inches. The stomach contents, fortunately principally mucus and gastric secretion, were extruded, and there was some bleeding from the sides of the wound. The wound was closed by interrupted Lembert suture, turning the serous coat well in, and the further course of the ball explored. There was a perforation of the liver about an inch from the lower edge of the right lobe, which was bleeding more profusely than the wound in the stomach. This was sewed up with catgut. Further search for the ball was unavailing, and the abdominal incision was closed with silkworm-gut sutures, dressed with iodoform gauze, bichloride gauze, cotton, and firmly compressed with adhesive strips. No drain was introduced. She had a nutrient enema every four hours and egg-albumen on the third day, later coming to milk, soft diet, and, finally, solid food in eighteen days. The sutures remained until the fifteenth day.

Highest temperature 102.8° F. on the fourth day. Bowels moved regularly. On the twenty-first day she was discharged well.

Some of the contributing causes for her recovery I think were the facts that she had an empty stomach when shot, my early arrival at the hospital, and the care of my nurses and assistants. Neither ball was ever located, and so far they are quiescent.

Case II. *Gunshot wound of liver; laparotomy; recovery.*— R. F., colored, single, aged twenty-two years, laborer, was shot about three miles from Sparrow's Point, Maryland, about 9 P.M., April 11, 1903. He was seen by my assistant, Dr. Woodward, who put on "first-aid dressing" and shipped him, three hours later, to the Maryland General Hospital, where he arrived at midnight. As his condition was reported as good, I operated the next day, twenty-seven hours after the injury, the patient then beginning to show signs of peritonitis.

I found a bullet wound, 0.38 calibre, in the right side, back of the junction of the cartilage and the tenth rib. Making a median incision, I drew out the stomach, etc., but found no perforation, except through the liver, which was left alone, because bleeding had stopped.

There was a considerable amount of blood in the abdominal cavity, which was cleaned out and the abdomen flushed and filled with salt solution. He was allowed liquid food, as his rectum refused to retain the enema, and from the fact that no perforation had occurred, I deemed it best to support him in that way. The patient did well, retaining food and with a moderate rise of temperature from time to time. Stitches were removed on the eleventh day, when I found a slight stitch abscess and some pus about the entrance of the wound. On the twelfth day he developed abscess of the lung on his right side, his temperature going up to 104° F., but subsided with the expectoration of a rather free discharge of pus and blood. His temperature and general condition having become normal for ten days, he was discharged from the hospital recovered on his thirty-sixth day.

Case III. *Gunshot wound of liver; laparotomy; recovery.*—Frank B., aged twelve years, Italian, with good family and personal history, was admitted to the Maryland General Hospital at noon, April 27, 1903, with history of having been shot by a playmate an hour before.

Examination showed bullet wound, 0.38 calibre, in right side between ninth and tenth ribs anteriorly. His condition was fair, with no marked shock; temperature, 99.8° F.; pulse, 100; respiration, 26. Vomited matter contained no blood. Twelve hours later, temperature, 102° F.; pulse, 100; respiration, 32. Enemata and stimulant retained. No marked pain. Twenty-four hours after injury, temperature, 102.2° F.; pulse, 140; respiration, 40. Was anæsthetized; track of bullet found to enter abdominal cavity, and, after cleansing track, made incision into abdomen along the lower border of ribs. Introducing my hand to point opposite bullet wound, found liver had been furrowed, and following that line, located bullet in the upper surface of liver under diaphragm. Removed bullet with fingers, washed out abdominal cavity with salt solution without suturing liver, as hemorrhage was not marked. Left a quantity of salt solution in cavity, and sewed it up with silkworm-gut without drain. (No wounds in stomach or intestine found.) Enemata and stimulant per rectum retained. Record four hours after operation: Temperature, 99° F.; pulse, 120; respiration, 32. Some vomiting during night, same character as first. Uninterrupted recovery, with slight variation of temperature. Liquid diet began early, as no contraindication in the way of wound of stomach or intestines, followed by soft food on the fourth day and solid food on the twentieth day. Sutures removed on the fourteenth day, and patient discharged May 19th, twenty-four days after injury.

Case IV. *Gunshot wound of intestine; laparotomy; recovery.*—This case is the mate of Case I., as the man that shot her then shot himself. James M., colored, aged twenty-three years, with good personal and family history, was brought three miles in the patrol wagon to the Maryland General

Hospital, January 30, 1903, together with his victim. A 0.32-calibre ball had entered the abdominal cavity in the right iliac region. There was not much shock. Tracing the wound back into the abdomen, I made another incision in the median line, and through it examined the patient, going over all the organs presenting carefully, and found only one place where the ball had ploughed across the gut without entering the lumen; everything else was uninjured. Having searched thoroughly, I brought the edges of the furrow together with Lembert silk sutures, washed out belly with salt solution, and put iodoform-gauze drain in case the gut gave way at the point of injury. The abdominal wound was closed with silk and aseptic dressing applied. Ball not found. Six hours after operation, temperature, 103° F.; pulse, 98; respiration, 24. Rectal feeding for three days. Milk on third day. Drain removed on second day. Solid food on fifteenth day. Patient made uninterrupted recovery in twenty-one days, and is now in jail serving a two years' term.

Case V. *Gunshot wound of intestines; seventeen perforations of gut; eleven of mesentery; laparotomy; suture; recovery.* —Richard C., colored, male, single, aged seventeen years, was brought to the Maryland General Hospital, May 5, 1903, with the following history:

Family history good, except that his father had died of heart disease and one brother from blood poisoning; had had gonorrhœa three years previous, but otherwise had been strong and healthy. Just prior to this accident he had eaten ice-cream and cake.

While standing looking on at an election row was shot in the abdomen. When put on the table he presented the appearance of a strong, well-developed negro, composed in manner, but suffering from profound shock. There was no pulse at the wrist, and collapse seemed imminent. Salt solution was injected in the thighs and strychnine given hypodermically. A wound from a 0.32-calibre ball was found in left side, just above Poupart's ligament, which, after washing, was found to go directly into the abdominal cavity.

A median incision was made below the umbilicus and the belly found to be full of blood. Through this incision the gut was drawn out into warm towels, and seventeen perforations of the small intestine and eleven of the mesentery were successively closed by Lembert silk sutures. No gut or mesentery was incised, though in some places the perforations were very near together. From these openings blood and fecal matter poured out, while there was considerable hemorrhage from the wounds of the mesentery. After the whole length of the gut obtainable had been gone over and sewed up, the abdominal cavity was freed of the clots and feces first by ladling out more than a quart by hand, and then flushing with gallons of hot salt solution. It required two and a half hours to close all perforations, the patient's strength being maintained by stimulants and salt solution hypodermically. The small intestine was the only gut injured, and no other gut was involved. Washing off the gut, it was replaced in the belly and the cavity filled with hot salt solution. An iodoform-gauze drain was kept in forty-eight hours, the abdominal wound being otherwise closed with silk and antiseptic dressing. Ball not found. Nutrient enemata every six hours. Morphine and salt solution hypodermically as needed.

Condition after operation: Temperature, 98.2° F.; pulse, 120; respiration, 40. Highest temperature during illness, 101.4° F. twelve hours after operation, and the rest of the time record shows condition nearly normal. He had no setback, and was discharged well three weeks after injury was received.

DISCUSSION ON THE PAPERS OF DRS. DOUGHTY AND JOHNSON.

Dr. D. F. Talley, of Birmingham, Ala.—This subject of intestinal obstruction and intestinal anastomosis is an interesting one. In cases in which we have obstruction due to a hernia, where we have external evidence of the trouble, there is not much danger of waiting too long before we operate. However, when

we have internal strangulation due to volvulus or to adhesive bands, or other condition, unfortunately the symptoms are not definite enough usually the first day to decide what we have. I know it is quite common in cases of obstruction from strangulation of the bowel for a patient to have pain in the stomach and not in the bowels. We can nearly always elicit a history in these cases of the patient having eaten something indigestible the night before, and it occurs to them that they may have a simple case of indigestion, something that may be slight and will pass off as soon as the bowels move. The pain is referred to the stomach absolutely in nearly all cases, even when the obstruction is situated low down in the pelvis. I think we should be quicker to operate in cases in which the patients suffer intense pain in the abdomen, and where the bowels seem to show no tendency to move after you have given purgatives. By doing so, we would save many cases that are now lost.

The essayist's report of cases of resection is interesting, particularly the report of his last case, in which he left no drainage, because about three weeks ago I saw a case of strangulation due to adhesive bands which had bound down the bowel to the region of the promontory of the sacrum. There were adhesions about the uterus to the left tube and ovary. I saw this woman the third day after strangulation. At the time she had a temperature of 100½°; pulse, 130. She was getting easier that day, the pain being much less than it was two days previous. I advised a hurried operation, although I told the patient and her friends that the chances were she would die even if an operation was done, because I felt positive gangrene had already taken place. She was taken hurriedly to the hospital. I operated, and when I got down to the peritoneum gangrenous fluid began to well up through the peritoneum. This deceived me, and I thought I was in the cavity, and began dissecting around. After I had dissected off a large amount of the parietal peritoneum I discovered that I had not yet gotten into the cavity. I went on through and found the abdomen absolutely filled with a black, gangrenous fluid, which smelled strongly of fecal matter. I resected two feet of the intestine, broke up adhesions, flushed the cavity with normal salt solution, and closed the abdomen without drainage. The patient did beautifully, and never vomited any more. She had no more pain after operation. On the ninth day a fecal fistula formed, and I could feel the button through this fistula. I removed the button through this fistula last Sunday. She has not had a particle of evidence of peritonitis since. The case was extremely interesting to me on account of that feature. I simply flushed the cavity out with normal salt solution, closed the wound without drainage, and she has had no peritonitis.

Dr. Charles H. Mayo, of Rochester, Minn.—I want to refer to the methods of technique in doing intestinal anastomosis.

There is one point I did not make clear in my remarks yesterday on resection of the colon. As was stated by one of the most prominent surgeons in America, he had sutured the large intestine after resection. Now, the question of when we can suture and when we must resort to colostomy will depend upon the obstruction. In many of these cases the obstruction may be due to carcinoma. When such a condition exists many of these patients are unable to get a fecal movement; the entire colon above the point of obstruction is filled with hardened fecal matter, and he is a bold surgeon who, in this particular condition, will trust to a suture operation or think of using any mechanical device, because the distention and the hardened fecal matter above the point of obstruction may cause leakage. At all events, there is great danger of leakage and infection.

The next question is with reference to cases of gangrene from hernia in which we have to do resection. Any method of anastomosis which is suitable for the case, and which the surgeon prefers, may be performed. But what shall we do with the peritoneum? A condition may have existed for some hours or a day or two, such as this: If we find bloody fluid and it is not absorbed, we will get elevation of temperature from fermentation fever, and this imposes an additional tax on the process of repair. When we have bloody fluid in cases of gangrene of the intestine, we should drain temporarily with the patient placed in the exaggerated Fowler position, with glass drainage-tube, which is preferable to gauze, although gauze may do.

Dr. H. A. Royster, of Raleigh, N. C.—Dr. Johnson has presented us with a successful array of abdominal gunshot injuries. Dr. Talley's cases are likewise exceedingly interesting and successful. I wish to mention a case which I believe is unique, and I think this is the place to do it.

A negro was shot with a 38-calibre ball which entered immediately over McBurney's point. As the direction of the wound seemed to be toward the midline, I opened in the linea alba six hours after the infliction of the injury. I found two wounds in the cæcum anteroposteriorly. The bullet tore off the appendix at its root, and it was left hanging by a strip of peritoneum. By means of the Lembert suture I closed the bowel wounds, snipped off the appendix, closed that orifice, and the patient recovered without any untoward symptoms. The only unsettled question in my mind about the case was this, that five weeks later, while at stool, the patient passed the bullet by the rectum.

Dr. George W. Crile, of Cleveland.—The group of successful intestinal operations are unusually successful, and I rise only to offer my sincere congratulations.

Dr. Johnson (closing the discussion on his part).—I think the reason why, probably, surgeons have not quite as good success

in Cleveland is not because the surgeons there cannot do the work as well as we do, but they do not have negro patients to deal with as we have. The negro population is more susceptible to injuries of the abdomen without death than the white people, and that readily accounts for the fact that we have had such decided success in this line of work.

Dr. Doughty (closing).—Negroes, as a rule, stand surgical operations well. Probably no one except a young and unusually hardy specimen of a hardy race would have survived the operation of resection of the bowel for volvulus, with the formidable blood poisoning which followed.

In the case of the woman who had intussusception, it was remarkable that she had so little general disturbance after the operation. There was nothing about the local conditions to suggest that the intussusception was chronic.

FIBROMATA OF THE TUNICA VAGINALIS.

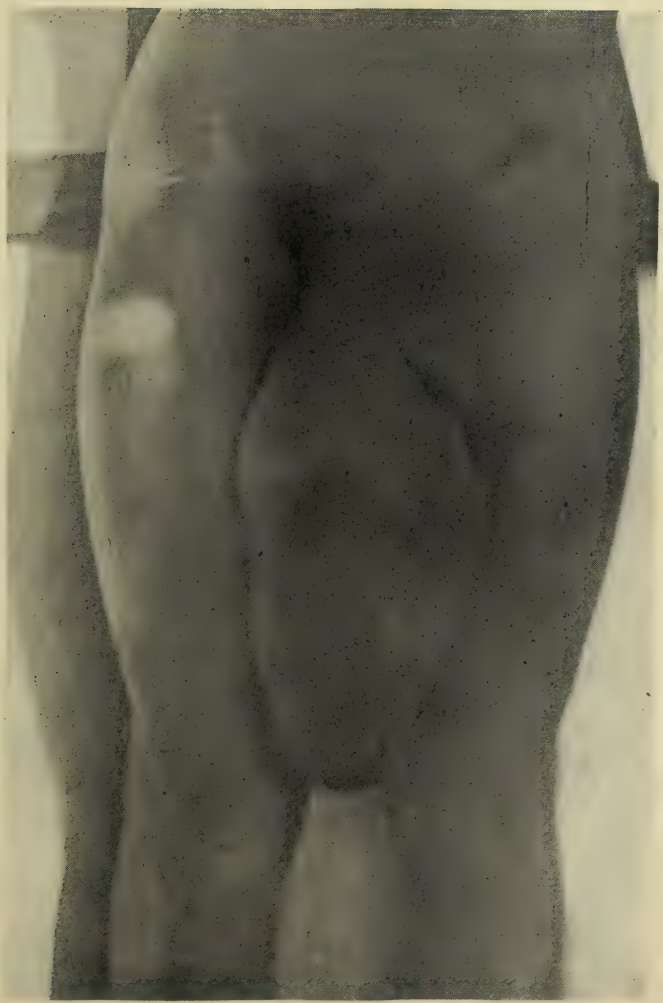
By Edward A. Balloch, M.D.,
Washington, D. C.

The case which forms the basis of this communication is as follows :

C. D., colored, male, aged sixteen years, and a farmer by occupation, entered the Freedmen's Hospital, December 9, 1902. He gave the following history : Was born and has always lived in the country. Father living and healthy. Mother died in 1890. Cause of death unknown. Eleven brothers and seven sisters living and healthy. Two sisters dead of unknown causes. Patient himself has always been healthy, having even escaped the usual diseases of childhood. Does not use alcohol. He stated at first that about eight years ago he had a yellowish discharge from the penis, followed by an abscess in the right groin, which statement he afterward denied. No history of any injury. The present trouble began over eight years ago, and first came as an enlargement in the upper part of the right side of the scrotum, and has continued to enlarge ever since. The growth has been painless. There has never been any enlargement of the scrotum, except that caused by the growths. The only inconvenience he has suffered has been that incident to the size of the growths and some pain after heavy lifting and overexertion.

Examination shows a greatly enlarged scrotum, reaching nearly to the knees. It is pyriform in shape, with the apex below. Skin of scrotum shiny from stretching, but otherwise normal. Veins of scrotum prominent. Right

Fig. 1.



Fibroma of tunica vaginalis. Appearance before operation.

testicle felt at a point 20 cm. (eight inches) below the external inguinal ring, and is normal in size, shape, and consistence. The cord can be traced to the external ring. Left testicle 10 cm. (four inches) below the external ring and feels normal in every way. The scrotum is not tense and does not contain fluid. The tissues of the scrotum have a flabby, gelatinous feel, which is peculiar. Three separate masses can be felt in the right side of the scrotum. One is high up, near the external ring, and the others lie diagonally from above downward. All are freely movable. No point of attachment can be made out, either to the testicle, cord, or walls of the scrotum. The upper mass is smooth and even ; the other two are lobulated. The lower growth feels somewhat larger than the others. All are hard and dense to the feel. Owing to his conflicting statement as to a urethral discharge, the groins were carefully searched for old scars, with an absolutely negative result. A keloid was found behind the right ear, the result of an old cut in that situation, 6 cm. (two and one-half inches) long. Thoracic and abdominal viscera normal.

The diagnosis was fibroid growths in the tunica vaginalis. This was based partly on the history of a slow, painless growth ; the absence of any glandular involvement and the freedom of the patient from cachexia of any kind. These points served to exclude tubercular or malignant disease, while the hard, dense, lobulated feel of the growths, with the presence of the keloid, indicated a positive diagnosis of fibroma.

Operation, December 15, 1902. Incision in the right side of the scrotum down to the growths. The tunica vaginalis was greatly enlarged and thickened and was converted into a gelatinous mass. The upper tumor ran up into the inguinal canal, and was attached there by a pedicle. The other two seemed to be connected with the raphe, although no distinct point of attachment could be made out. If one existed it was a very loose one. All the growths were enucleated without difficulty. In dissecting

out the gelatinous tunica the cord on the right side was cut accidentally and, together with the testicle on that side, was removed. This accident was deplored at the time, but, in view of the report of the pathologist, it is perhaps as well that these structures were removed. The excess of skin in the scrotum was removed and the wound closed without drainage. Healing was aseptic and uneventful. The largest growth measured 13 cm. by 8 cm. (five by three inches), and the other two 10 cm. by 6 cm. (four by two and one-half inches). The weight of the entire mass, tumors and tunica, was 1644 grams (fifty-eight ounces). The tumors alone weighed 1077 grams (thirty-eight ounces), and the tunica 567 grams (twenty ounces). I have heard from the boy recently to the effect that he was in perfect health and strength.

The report of the pathologist was that the main structure of the growths was fibrous tissue. At many points throughout the mass were areas of myxomatous and fatty degenerations. The tunica vaginalis was myxomatous throughout. The testicle also showed areas of myxomatous degeneration. He classed the tumors as soft fibrous growths undergoing degeneration.

In considering these unique growths it must be accepted, I think, that they are essentially fibrous in character, and that the fatty and myxomatous areas are but expressions of the degenerations which fibrous growths anywhere are liable to undergo. This association of fibroma with myxoma and lipoma has been noted in fibrous growths in various situations, and is a well-recognized fact.

As to the etiology of these tumors, it is probable that, in spite of the absence of any such history, there must have been some injury or irritation which acted as a starting-point. The vague history of something like a gonorrhœa may explain this. It is notoriously difficult in people of his race to get anything like a connected or reliable history. It is hard to conceive of the spontaneous origin of growths like these from the tunica vaginalis. Another factor of

Fig. 2.

some importance is the existence of the keloid growth behind the ear. This may be reasonably interpreted as showing a tendency to fibromatosis in this individual.

The writer has elsewhere[1] called attention to the tendency to fibroid degeneration as a peculiarity of the negro race, and offers this case as a confirmation of the theory there advanced.

It may be of advantage for purposes of comparison to consider for a moment the occurrence of fibrous growths in some of the other serous cavities. Fibromata have been found in the peritoneum, the pleura, the pericardium, and the joint cavities. In the meninges the growth takes the form of sarcoma. In the pleura and peritoneum free growths have been found which are explained on the theory that they existed first as fibrous elevations on the surface of the membrane, originating in the subserous connective tissue, then became pedunculated, and, finally, by the constriction and severance of the pedicle, became loose, floating bodies.

Myxomatous peritonitis, while rare, does exist and gives rise to masses of gelatinous, straw-colored material, which may be scooped out of the cavity and may be mixed with fibrin. It is secreted by the peritoneal endothelium, and is generally secondary.

That some such course of events must have occurred in this case seems likely, owing to the extensive myxomatous degeneration of the tunica vaginalis. The entire membrane was converted into a gelatinous mass resembling the Whartonian jelly of the umbilical cord. This, however, does not explain the myxomatous degeneration of the testicle. Whether this was primary or secondary is a point of great interest, and one which it is very difficult to decide definitely. From the limited areas of degeneration it seems probable that it was secondary.

A careful consideration of all the facts in this case would seem to indicate a chain of events somewhat as follows: An irritation to the tunica vaginalis from an injury or a

possible gonorrhœa was followed by a myxomatous degeneration of that membrane. The consequent irritation of the subserous connective tissue resulted in the formation of fibrous nodules which gradually became pedunculated, and finally, in the case of two of them, resulted in their becoming free in the cavity, the third being still attached to the membrane. The myxomatous degeneration of that part of the tunica overlying the testicle may have resulted in a similar degeneration in that organ.

A case reported by Curling[2] shows that this supposition is not improbable. Curling's patient was a man aged twenty-four years, in whom the disease had existed for eighteen months. The cavity of the tunica was found to be distended by yellowish, morbid material, resembling fibroid matter, growing from the visceral surface of the tunica. It was laminated in structure and of a fibroplastic appearance under the microscope. The external parts of the deposit were organized. Patches of a similar structure were found in the testicle, and the epididymis was infiltrated and destroyed.

Had this case gone on long enough it is probable that a condition similar to that found in my case would have resulted. The case is rather vaguely reported, but the description indicates a myxomatous degeneration, especially as it is clearly stated that there were no evidences of tuberculosis.

An examination of the literature on this subject shows that the case reported is practically unique. I have examined all the references in the library of the Surgeon-General's office, except one in Japanese, and can find only one other case at all resembling mine. There are several references to what, at first sight, seem to be similar growths, but upon a closer examination are found to be essentially different.

The great majority turn out to be cases of cartilaginous or calcareous degeneration of the tunica vaginalis, following syphilis or prolonged suppuration in the scrotum and testicle.

The case referred to as most closely resembling mine is the one reported by Holmes.[3]

His patient was a man, aged fifty-one years, who had had a tumor of the scrotum for thirty-three years. At the time that it came under Holmes' observation it was as large as a cocoanut, but it was stated that recently the growth had been quite rapid and that it had become more painful. At the operation it was found to be situated above the testicle and in front of the cord. It was removed, and was found to be "solid, with soft spots." It was connected to the testicle by some areolar tissue, and was thought to spring from the tunica vaginalis. On section it presented a grayish mass with glistening bands radiating in all directions. The centre was soft. Under the microscope it showed fibrous tissue, free nuclei, and oil globules.

In the same volume Jessop[4] reports a case of tumor of the left side of the scrotum in a man aged forty-nine years, which had existed for ten months and was the size of a child's head. The tunica contained fluid. The testicle is reported as "obscured," whatever that may mean. Microscopic examination showed areolar tissue. The tumor had grown rapidly, owing to an infiltration of albuminous fluid. The pathological report was to the effect that the elementary parts of the tumor were referred to the connective-tissue group, the structure varying in different situations. Some parts showed waxy-white connective-tissue network enclosing fat cells. The report closes by saying that the tumor showed the character of "lipoma, fibroma, and sarcoma."

It may be said of this case that the pathological report, like the testicle, is "obscured," but that, while very imperfectly reported, it resembles more nearly than anything else a sarcoma of the testicle.

E. Chambord,[5] in his thesis, *Étude sur l'anatomie et la pathologie de la tunica vaginale*, which is an exhaustive study of the subject, makes no reference to fibrous tumors of the tunic, except the "floating bodies" in the tunic

that sometimes occur after hydrocele, and especially after iodine injections for its cure.

Tikhonovich[6] reports a case of a man, aged twenty-four years, who entered the hospital complaining of pain in the left testicle. Seven years before, while hewing wood, had struck the left testicle with the handle of an axe. Painless tumors soon appeared on the posteroexternal surface and gradually grew to their present size. On palpation the left testicle was of normal consistency; larger than the right. On the anterointerior surface are felt tumors varying in size from a lentil seed to a large pea. The tumors are movable in relation to both testicles and scrotum. On upper part of testicle where the epididymis is situated is a tumor the size of a large hazel-nut, knotty, irregularly spherical. It is movable and is sharply distinguished from the testicle and scrotum. Spermatic cord, which feels normal, runs into tumor.

Operation, October 26, 1900, showed that the small tumors were in the tunica vaginalis, covering the epididymis and upper part of the testicle, while the large tumor was separate. As the vas deferens was involved with the smaller tumors, the testicle was removed. On examination, two nodules, size of lentil seeds, were found in the testicle itself, besides those recognized before operation. Microscopic examination of the growths showed fibrillar connective tissue passing in bundles through the entire tumor, with spindle and round cells, the latter most marked along the course of the vessels.

Reclus[7] and Melchior[8] report cases of small floating bodies in the tunic, following hydrocele treated by the injection of iodine. Quite recently, in operating on an old case of hydrocele, I dissected out a thickened tunic which was studded with small fibrous nodules. In this case there was no history of any previous treatment by iodine.

These cases, while hardly analogous to the one under discussion, are yet of interest as tending to show the importance of irritation as a factor in the production of these growths.

The following conclusions may be drawn :

1. That, like other serous cavities, the cavity of the tunica vaginalis may be the seat of fibrous growths.

2. That irritation is an important factor in their production.

3. That they spring originally from the subserous connective tissue, but may become detached therefrom and lie loose in the cavity.

4. That they are mostly of the variety known as soft fibroma.

5. That they are prone to myxomatous and fatty degeneration.

6. That the testicle may be affected by the same forms of degeneration.

7. That these growths are generally minute, the present case being unique, both as to the number and size of the tumors.

8. That as the testicle is likely to be affected, the propriety of removing it when the growths are excised should be considered.

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DISCUSSION.

DR. W. L. ROBINSON, of Danville, Va.—I regret very much that I did not hear this paper. Did the author convey the impression that it was a malignant tumor?

DR. BALLOCH.—No, sir; simply a soft adenoma.

DR. HORACE J. WHITACRE, of Cincinnati.—I have, of course, had experience with this form of growth, although I have seen

the small tumors such as have been mentioned. It seems to me that the explanation of the essayist regarding the nature of this tumor is correct, namely, that it has developed from the smaller fibrous-tissue tumors which sometimes form beneath the serous surface, and later become pedunculated. Indeed, the process seems to be exactly that which leads to the formation of the rice bodies found in tubercular synovitis. I have recently operated on a case of tubercular synovitis in which there were rice bodies varying in size from a millet seed to a fair-sized marble, and in which the wall of the sheath showed the bodies in all stages of evolution. Dr. Balloch has brought up the question of the nutrition of the tumors reported. It seems to me that an analogous condition is presented by which they maintain their nutrition, even though there are practically no connections with the surrounding tissues. The case reported by Dr. Balloch is extremely interesting.

Dr. Balloch (closing).—In reply to the remarks of Dr. Byford, the pathologist reported simply fibrous tissue, with myxomatous and fatty areas of degeneration. I have photomicrographs at home, but did not bring them. They do not show anything more than fibrous tissue. You can see where the specimen has been cut. Further examination of other areas may show muscular fibres.

The smaller specimen from a case of hydrocele shows the beginning of these fibrous nodular outgrowths, which seldom attain any size.

If the case is unique, I am glad of the opportunity of presenting it first to this Association.

EXTRAUTERINE GESTATION.

By T. J. Crofford, M.D.,
Memphis, Tenn.

From an examination of the literature at my command I am of the opinion that the following case, the specimen of which I here present, is unique.

Anna R., a colored woman, presented herself at the clinic. Slightly to the right of the median line of the lower abdomen there was an enlargement of two or three months' standing, the size of which, as best as I could determine by means of palpation and the bimanual examination, was about the size of a large cocoanut. Upon opening the abdomen over the growth the first thing observed was the appendix vermiformis pressing against and adherent to the anterior wall of the abdomen. The adhesions were liberated and the appendix removed. The adjoining bowel was next liberated from a retroperitoneal cystic tumor of five or six inches in diameter, which at this time was supposed to be a parovarian cyst. The enucleation was proceeded with cautiously lest hemorrhage might occur. The separation of the tumor from its adhesions all around was practically bloodless; not one vessel required ligaturing.

DISCUSSION.

Dr. Henry T. Byford, of Chicago.—Perhaps Dr. Crofford explained to me a little more in detail yesterday this specimen than he has done now. I understood him to say yesterday that he got it from the broad ligament. If this is the case, I suggested to him that it might have been a case of pregnancy that

had ruptured into the broad ligament, but maintaining a sufficient connection to keep up life and develop to a certain period, and then losing most of its vascular connection, so that when he enucleated it he had no hemorrhage to deal with.

Dr. Guy L. Hunner, of Baltimore.—I had a case similar to this last spring. I was called to see a patient who was suffering from severe abdominal pain in the region of the appendix. I found quite a large tumor, probably the size of a five months' pregnant uterus, in the hypogastric region, and on examination I took it to be a pregnant uterus. In addition, I could make out a rounded tumor mass in the right flank, with an irregular body across the epigastrium; and while examining the patient I found there were distinct movements, as of small parts both in the right flank and across in the left flank. I had the patient transferred to the hospital, watched her for two or three days, and it was interesting indeed to watch the fetal small parts in the epigastric region. The fetal heart could be plainly heard in the middle line in the epigastrium, but no fetal heart could be heard over the uterine mass. After etherizing the patient we could make out that the enlarged uterus was made up of nodular, hard bodies, apparently myomata, with a softer boggy mass on top of the uterus which we took to be the placenta. On opening the abdomen the gestation sac presented, which was cut into, and the fœtus delivered alive from this extrauterine sac. The control of hemorrhage was not difficult. As soon as the abdomen was opened, I reached for the left ovarian vessels, clamped them, and then clamped the left utero-ovarian ligament so that I could work deliberately and not fear hemorrhage from the placenta, which was on top of the uterus and over the left broad ligament. The case was apparently one in which early rupture or abortion from the tube had taken place into the abdominal cavity, and it seemed normal in every way except for its habitat at the end of five and a half or six months.

Dr. I. S. Stone, of Washington, D. C.—With reference to the pathology of similar cases, I am not certain whether they would come in this category. There is not sufficient attention paid to the development of extrauterine pregnancy. Dr. Crofford's case might have been one in which rupture had taken place into the broad ligament. I know positively that in several cases in my own experience such a thing has not occurred. There has been tubal rupture, a folding over on the posterior surface of the broad ligament, with the formation of an adventitious membrane from blood clot, which has grown with the fœtus, and sometimes the blood clot is so large that it distends the pelvis and reaches up into the abdomen. The average operator goes in, finds the ovarian artery, and what proves to be the chief blood supply is tied off. He does not make further investigation. In a number of cases the tubal rupture is not

in the folds of the broad ligament, but outside of it. I have conclusively proved this by a careful examination of two cases that I had, one of which had already unfortunately terminated fatally. Following up the blood supply showed the ovarian artery and its anastomosis in the broad ligament to be perfect, so that rupture could not have occurred into the broad ligament under these circumstances.

Dr. W. D. Haggard, of Nashville, Tenn.—I had occasion a few days ago to operate upon a woman for unruptured tubal pregnancy of about two and a half months' duration. It is the first case I have been able to diagnosticate before operation. She recovered.

Some years ago I reported six consecutive cases of vaginal section for tubal pregnancy, without a death; all of them had occurred within a period of eighteen months.

I desire briefly to refer to a patient who had ruptured tubal and resulting abdominal pregnancy. Gestation continued until six months, at which time the woman was conscious of cessation of motion, the fœtus having died. The soft parts were absorbed, and at the end of a year the patient began to pass the fetal remains by the bladder. First, she passed little pieces of the tarsus, then the vertebræ, and some of the slim long bones, the femur, the tibia, and the humerus. Three of these bones she passed through the urethra, taking her half a day. She would suffer considerably when these bones were about to pass, and finally she would get hold of the pieces in the urethra and gradually work them out. She had a violent cystitis and almost incontinence of urine. She had been passing these bones at varying intervals for about a year, and the fragments numbered about eighty in all. She was exquisitely tender. By means of vaginal cystotomy the remaining part of the skeleton was removed by ordinary stone forceps through the incision. This included the skull bones, which, of course, were so large that they could not be passed *per urethram*. The fistula was allowed to remain open for six weeks and was then closed. She made a satisfactory recovery.

Dr. W. L. Robinson, of Danville, Va.—I suppose most of the members of this Association have had cases of long standing in which patients have passed fetal bones by the bowel or some other route. Recently I had a case of extrauterine pregnancy of six and a half months' duration, in which I stitched the sac and delivered.

If I understood Dr. Crofford's remarks correctly, his case was one of extrauterine pregnancy, in which he was enabled to enucleate the fœtus without the application of any ligature for the control of hemorrhage, and that the peculiar feature was that there was nothing to be done except the enucleation without a ligature.

Dr. Wm. H. Doughty, of Augusta, Georgia.—As many of the members have reported various cases bearing on this subject, I should like to say that I presented a specimen at the meeting of the Georgia Medical Association held in Augusta last year. The woman had been pregnant and had gone over her time, I think, probably up to twelve or fourteen months. When the abdomen was opened it was found that she had a full-term fœtus, or thereabouts, and it was removed precisely as one would remove an ovarian cyst. It was attached by a pedicle. There were no other attachments except a few to the omentum, which were easily separated.

I am under the impression that this was a true case of impregnation and development in the ovary, for the reason that the shoulders of the fœtus seemed to be set down in a sort of cup. I do not know positively whether this was such an impregnation or not. But it was attached by a stalk the same as an ovarian tumor would be attached, and was removed in the same way. I sent the specimen to the Johns Hopkins for investigation, but thus far have heard nothing in regard to it.

Dr. M. C. McGannon, of Nashville, Tenn.—About a year ago a professional friend asked me to see his wife. He said that she had been subject to some intra-abdominal trouble which had been diagnosticated as probably a tubercular peritonitis. After getting a history of the case, and examining the woman, it was my belief that she had an extrauterine pregnancy, and I advised an operation. At the operation I found a condition very much similar to that which has been described by the essayist. I was able to strip up and remove a sac similar to the one exhibited, with the exception that the sac was attached to the fimbriated extremity. My explanation of the trouble at that time was that there had been an abdominal pregnancy, that is, pregnancy had gone on in the outer end of the tube until it had become sufficiently large to slide out through the fimbriated extremity into the abdominal cavity. Some hemorrhage had taken place, and the adhesions or exudate thrown out around the mass in the peritoneal cavity undoubtedly produced the sac which I found. The sac lay behind the uterus in the hollow of the sacrum, so that I was able to dissect it out very much as Dr. Crofford did in his case. The fœtus in the sac was about the size of the one exhibited by the essayist.

I have a specimen at the present time which is not only similar but identical, with this exception, that it was attached to the outer end of the tube, and I removed the outer end of the tube with the sac at the time of the operation. Only last week I operated upon a somewhat similar case. The fœtus was not nearly as large as the one shown. There was a large blood clot that had become somewhat organized. I was able to strip it off and remove the mass intact. However, in so doing I tore

through the outer covering or sac formed by the more or less organized exudate in a number of places. I offer this as an explanation of the condition we have under consideration at the present time.

Dr. Crofford (closing).—From what has been said I do not think any one of the speakers clearly understood my position in regard to this case. Dr. Byford said he did not think the case was unique because many of them ruptured between the layers of the broad ligaments.

We did not claim that this case was unique on account of having ruptured between the layers of the broad ligaments, or because it possessed a gestation sac which was developed between the layers of the broad ligaments, but that it possessed a sac capable of being enucleated without rupture at any point. This is why it was unique.

It is hardly necessary for us to recount the course taken by the fœtus or the hemorrhage, whether it ruptured above or below. There is no claim for superiority on our part in the enucleation of the tumor, but, as before stated, the fact that it possessed a sac of sufficient strength to allow it to be enucleated without breaking through at any part of its circumference. This was why it was unique, and only this do we claim for it.

After the operation had been completed the tumor was rolled across the floor into an out-of-the-way corner of the room without breaking the sac. Upon cutting into the tumor the fœtus projected from the sac and the amniotic fluid, which was apparently normal in character, poured out upon the floor; none of it leaked out prior to the incision in the sac. Thus the sac was not only sufficiently strong as to admit of enucleation, but had no opening that would allow so thin a fluid as the amniotic to escape.

THE RESUSCITATION OF THE APPARENTLY DEAD AND A DEMONSTRATION OF THE PNEUMATIC RUBBER SUIT AS A MEANS OF CONTROLLING THE BLOOD PRESSURE.

By George W. Crile, M.D.,
Cleveland, Ohio.

The pneumatic rubber suit is constructed of a double layer of specially made rubber, which, when inflated, exerts a uniform pressure upon the surface, constituting an artificial peripheral resistance. It is so constructed that one or more limbs or the abdomen may, separately or in combination, be subjected to pressure by inflation by means of a bicycle pump. The air valves are so adjusted that the rate of decompression may be completely controlled. The effect of the suit upon the blood pressure may be checked by means of a sphygmomanometer. The general blood pressure may be varied at will within a range of 25 mm. to 75 mm. of mercury. The rise has been sustained as long as twelve hours. In the late stage of fatal acute infections there was but little benefit, although the blood pressure could be raised. In operations upon the head and neck which are likely to be attended by dangerous shock and collapse the pneumatic suit is put on the patient prior to operation. The circulation of the patient is considered, and a certain level is decided upon at which the blood pressure shall be maintained. An experienced assistant is detailed to watch the blood pressure by means of the sphygmomanometer. If the pressure falls to the lowest level of estimated safety the pneumatic suit is

The pneumatic rubber suit.

gradually inflated. By inflation and deflation the blood pressure may, within certain limits in the heaviest operations, be maintained at a given level. At the close of the operation and so long as necessary the blood pressure is watched and deflation gradually made. In a laryngectomy, with extensive resection of lymphatic bearing tissue of the neck, moderate shock developed.

During the experimental stage the influence of the pneumatic suit upon the blood pressure was strikingly demonstrated in a pulseless case in which the blood pressure was raised to 110 mm. Having reached this register the suit broke, it being under considerable pressure, and the blood pressure fell from 110 mm. to the pulseless condition below 40 mm., the patient becoming unconscious. In another case, during an extensive operation for cancer of the tongue and of the glands of the neck, the blood pressure fell from 140 mm. to 112 mm., and the normal blood pressure was restored by inflating the suit. After the operation deflation was gradually made during several hours. The patient's circulation was thought to be satisfactory. There was considerable oozing in the back part of the floor of the mouth which became troublesome. The head and shoulders were elevated, syncope immediately occurred. The rubber suit was at once inflated and the syncope as rapidly disappeared. A back-rest was then arranged, and the patient was placed in a semisitting posture without ill effect. The oozing ceased, and later the patient was placed in a horizontal posture and the suit slowly deflated.

In operations upon the head or neck, in which the sitting or reclining posture is desired, by means of the pneumatic suit the bulk of the blood may be kept circulating in the thorax, neck, and head. This posture is of marked importance in such cases as removal of vascular goitre, Gasserian ganglion, etc., in which venous hemorrhage is most troublesome. The recovery of the blood pressure on inflating the pneumatic suit is often striking. The effects may be often noted in the superficial circulation of the face.

If continued for some time, especially after the condition of the patient has improved, the pressure of the suit may become annoying. The suit has been in use for almost two years, and increasing experience has more than confirmed the early expectation.

On the Resuscitation of Animals Apparently Dead.

(*a*) *Preliminary Statement.* Research heretofore has been directed principally toward the resuscitation of the isolated heart. The restoration of the function of the vasomotor and other centres, while of equal importance in resuscitating the entire animal, has received but scant attention. The present research was directed toward the resuscitation of the entire animal.

1. By mechanical, therapeutic, and electric stimulation of the heart, in conjunction with artificial respiration.

2. By alternating the posture, head down and head up, in rapid succession, alone, and in conjunction with the preceding.

3. Suspension of the animal head downward and rhythmic pressure upon the thorax over the heart.

4. Artificial respiration, rhythmic pressure upon the thorax over the heart, and intravenous administration of adrenalin.

(*b*) *Brief Statement of Previous Research.* Arnaud bled a rabbit until its heart ceased beating. After the lapse of ten minutes warm defibrinated blood was injected into the aorta toward the heart. Regular contractions, which continued for some time, almost immediately appeared. The blood pressure was not restored.

Hedon and Giles, as stated by Langendorff, repeated this experiment on the heart of an executed criminal about one hour after his execution. There was then no response to irritations, but on injecting warm arterial blood into the coronary arteries distinct rhythmical pulsations of the auricles and right ventricles appeared. An identical result is reported by these observers to have been obtained in a dog. In neither the man nor the dog was the circulation restored.

Langendorff in similar experiments found that an apparently dead heart would resume energetic and frequent contractions by the infusion of arterial blood. It is said that these attempts were always attended with success, providing that the heart was not in rigor. In one case a cat could not be resuscitated by the usual means from a chloroform death. Two hours after the removal of the heart from the body it resumed contractions on the injection of warm arterial blood.

In a recent communication (1902) Kuliabio presents the most complete treatise on this subject which has yet appeared. With the injection of Locke's fluid, which contains the same mineral ingredients as the blood and 0.4 per cent. of dextrose, and which has been shown to greatly prolong the duration of action of an isolated mammalian heart, the isolated rabbit's heart, after it had ceased beating for ten, fifteen, and twenty minutes, resumed pulsation. In another experiment the action of the heart had been interrupted for twenty, twenty-one, and twenty-five minutes, respectively, and again resumed contractions. After this it was covered with snow for two minutes. The heart beats then ceased. With the removal of the snow they reappeared, being now even stronger, although less frequent than before. Subsequent to this the heart was allowed to remain in a cold atmosphere overnight. Upon renewing the circulation with Locke's fluid the following morning the contractions immediately reappeared around the region of the inferior vena cava, and later they also extended over the auricles.

In another experiment a rabbit's heart which had lain on ice for eighteen hours was also subjected to this artificial circulation. Within half a minute forcible rhythmic contractions in the region of both vena cava appeared, which soon extended over the auricles. After about half an hour strong rhythmic contractions of the right ventricle also appeared. The left ventricle remained quiescent. The pulsations of the heart were during this time (three hours) irregular, in that after six or eight weaker contractions a

stronger one followed. Four and one-half hours after the beginning of the experiment the contractions ceased, and neither electrical nor mechanical stimulations were effective.

The longest period of cessation of cardiac action after which the heart again resumed its function is stated in the case of a cat's heart to be twenty-four hours. It was during this time placed in a refrigerator. A rabbit's heart similarly exposed for forty-four hours again resumed its contraction for a period of over three hours.

While these experiments have all been practised in the isolated heart, resuscitation of this organ *in situ* is reported to have been accomplished by Watson after its cessation from chloroform narcosis. In a series of experiments on dogs to determine the feasibility of puncturing the heart, or cardiocentesis, in death from chloroform, it is stated that out of sixty experiments the heart failed to resume its action in only two instances. The average time which elapsed in these experiments between the cessation of the heart's action and the introduction of the instrument was one minute and twenty seconds, the longest period being two minutes. In but two of these sixty experiments was the circulation re-established.

In the remaining experiments the action of the heart aroused by the puncture persisted but a few minutes. Prior to my own experiments, Professor George N. Stewart made experiments upon resuscitation by the use of adrenalin in Locke's solution infused into the aorta. Respiratory action and some feeble heart-beats were noted, but the animals did not recover.

(*c*) *Summary of Experimental Data.* When asphyxia caused failure of the heart and respiration, vigorous artificial respiration usually restored their function when administered within a few seconds. It was effective in an inverse ratio to the time that had elapsed ; it was rarely effective after forty seconds. By the addition of saline infusion a larger proportion of animals could be resuscitated after the lapse of a little longer time.

Rhythmic pressure upon the heart, either through the thorax by pressure upon the ribs over the heart or direct pressure within the thorax, was also an aid. The effect of the traumatism to the heart by the direct method partially counterbalanced the benefit from this measure. Nitroglycerin, alcohol, and digitalis were useless; rapidly alternating the posture—head up, then head down—was not effective. Suspending the animal head down and making rhythmic pressure upon the heart was an effective method. This method gave the brain the advantage of gravity; it provided a moderate artificial circulation as well as respiration. It could be promptly applied. The addition of saline infusion increased the effectiveness of the method.

Animals apparently dead for periods up to fifteen minutes were resuscitated by the combined effect of artificial respiration, rhythmic pressure upon the heart, and the infusion of adrenalin. When the blood pressure had risen to 30 mm. Hg. or more the heart began to beat and the blood pressure was rapidly restored. The return of respiration was signalled by a short, almost imperceptible movement of the diaphragm, the respiratory action becoming gradually stronger and more frequent. The conjunctival reflex returned early. Some of the experiments failed on account of too great elevation of the adrenalin bottle, some on account of an overdose of adrenalin; several were only partially successful, owing to the great dilution of the adrenalin. Adrenalin, when injected directly into the chamber or into the wall of the heart, caused fibrillar contractions, after which the heart could not be resuscitated. After final cessation of the heart, by employing manual compression of the heart and infusing adrenalin, the blood pressure could be raised even higher than the normal. Respiration in some instances was partially restored.

In some of the animals considerable bruising of the spleen was noted. In the recovery experiment the animal showed restoration of all its ordinary functions. In experiments in which the heart was directly observed through a window

in the chest during its gradual cessation the waves of contraction of the venous trunks were last to disappear and earliest to reappear when resuscitation occurred.

Experiments in which saline infusion was substituted for adrenalin, and which were unsuccessful, were promptly successful on adding adrenalin.

In a patient with crushed skull admitted to Lakeside Hospital, and whose heart had ceased beating for nine minutes, resuscitation of the heart for thirty-one minutes by this method was made. During the operation for the elevation of the depressed bone the patient moved his head.

Another patient apparently dead from a severe crushing of the base of the skull was partially resuscitated twenty-four minutes after the apparent death. The proofs of the apparent death were absence of respiration, absence of heart sounds on a stethoscopic auscultation, and, as a final proof, on opening the jugular vein there was absolutely no circulation. In this case the blood pressure rose to 80 mm. at one time; voluntary respiration appeared. These evidences of vital action continued for thirty-four minutes. In the course of an extensive exploratory operation upon the cerebellum and the base of the brain for tumor the patient went into rather a sudden collapse and apparently died. The following notes from the Lakeside Hospital records gives the sequence of the events :

10.15. No visible respiratory movements.

10.16. No palpable pulse and no sound on auscultation of heart.

10.20. Intravenous apparatus set up and connected with a median basilic vein. The infusion did not flow into the vein.

10.23. Cannula was placed into the right jugular vein and an infusion of saline and adrenalin, 1 : 50,000 at the rate of 4 c.c. per minute was administered. Artificial respiration and rhythmic pressure upon the thorax over the heart.

10.40. Radial pulse first noted.

10.41. Regular respiration and a good radial pulse.

10.45. The patient was taken to the ward; adrenalin and saline continued at the rate of 1 c.c. per minute.

10.55. The patient was dead.

It will be seen from these data that the efforts at resuscitation were begun eight minutes after all of the usual signs of life had disappeared. It was twenty-four minutes before the radial pulse appeared. The pulse rapidly became of good volume and regular rhythm. In this case the pneumatic suit had been applied during the administration of the anæsthetic and rendered great assistance in tiding over the circulation crisis. The method of resuscitation consisted in making rhythmic pressure upon the thorax over the heart, maintaining artificial respiration by means of the Fell-O'Dwyer apparatus, the continuous intravenous administration of adrenalin in salt solution, and the application of the pneumatic rubber suit. From the experimental standpoint the resuscitations were successful. From the clinical, only partially so. It seems clear, however, that actual death does not occur at the time of apparent death, and that in cases in which there are no lesions inconsistent with life, at the moment of apparent death our efforts should not cease.

DISCUSSION.

Dr. W. L. Robinson, of Danville, Va.—I should like to ask, for information, how long after apparent death, if the blood retains its physiological action, is a patient capable of being resuscitated with this device?

Dr. George R. Dean, of Spartanburg, S. C.—I should like to ask Dr. Crile whether he uses chloroform narcosis in his work? Do you transfuse in the upper part of the chest or body?

Dr. O. L. Shivers, of Marion, Ala.—I should like to ask whether you have ever tried this method in stillborn children that are perfectly developed?

Dr. Crile (closing).—In reply to the first question, I am unable to answer it. We do not know the length of time, after apparent death, it is possible to resuscitate a patient by this method; but I think it is much longer than we have heretofore supposed. Physiological facts are bringing that out. We must

find out the border-line of apparent death, and I feel sure it has not been thoroughly worked out.

As to the application of this method to stillborn babies, I have had no experience. I do not know what it would do. The arm being the most convenient, its veins have been more frequently used for infusions.

Q.—How much adrenalin do you use?

Dr. Crile.—Fifteen minims of a 1:1000 solution of adrenalin chloride in 1500 c.c. in ordinary cases of shock.

As to chloroform narcosis, I will refer in passing to the observations of Sherington, who has shown that in chloroform narcosis, when the heart has been functionally destroyed by chloroform, if the chloroform is washed out of the heart the heart will go on beating.

In conclusion, I do not wish to be understood as presenting these matters in an enthusiastic way, as they have their limitations. It is to be hoped that they will serve as an incentive for further work.

A CASE OF COLLOID CARCINOMA OF THE RECTUM, WITH EXCISION BY THE COMBINED VAGINAL AND INGUINAL ROUTES.

By Horace J. Whitacre, M.D.,
Cincinnati, Ohio.

The case of colloid carcinoma of the rectum which I report to-day presents certain unusual pathological and clinical features that are believed to justify its recital.

Anna S., aged nineteen years, consulted me in August, 1901, concerning a stricture of the rectum, which had been diagnosticated by her family physician. Her family history was negative as regards tuberculosis, syphilis, and cancer. Her personal history was that of perfect health up to the time of her present illness. She gave no personal history of syphilis. Her bowels had moved regularly and normally until one year ago, when she noticed an increasing difficulty in accomplishing a satisfactory movement, even though she was taking large doses of cathartics. There was neither pain nor hemorrhage on defecation. This trouble grew gradually worse during the next year, and medical aid was needed on several occasions for the relief of attacks of obstruction of the bowels. Her physician, Dr. B. P. Goode, found a narrow stricture of the rectum to be the cause of her difficulty in defecation, and relieved her in each of her attacks by the persistent use of enemata. He advised operation, but this treatment was refused until the date mentioned, August, 1901.

When I first saw the patient her general appearance was that of almost perfect health; her cheeks were rosy and her complexion was clear. Physical examination was negative,

except for the rectum. Digital examination of the rectum revealed a narrow constriction two inches above the sphincter. The calibre of this stricture was about that of a No. 27 French scale sound, and the constricting tissue was so firm and solid that the examining finger could not make the slightest impression in dilatation. A bimanual examination, made with one finger in the rectum, the other in the vagina, revealed the fact that we had to deal with a very long constricting mass, which had transformed the rectum into a rigid tube for at least two and a half inches of its length. The vaginal finger seemed to reach the upper end of this mass, however, and I decided to remove the constricted portion of the rectum by the vaginal route. Bimanual examination, made with one hand on the abdomen and one finger in the rectum or the vagina, gave no additional information regarding the stricture, but demonstrated the uterus and ovaries to be normal. Inspection revealed a normal mucosa covering the first two inches of the rectum and the face of the stricture to its very margin. A No. 27 urethroscope could be introduced into the strictured portion for only one and one-half inches. The lumen of the strictured portion appeared red and superficially eroded, but no deep ulcers were seen, and the surface did not bleed to any degree after instrumentation. The introduction of this instrument gave satisfactory demonstration of the rigidity of the small calibre and the length of the stricture.

A diagnosis of hyperplastic tuberculosis of the rectum, with extensive stricture of the lumen, was made, and the patient prepared for operation.

Operation. The patient was placed in the lithotomy position, and an incision made for the whole length of the posterior wall of the vagina and dividing the perineum down to the sphincter. The new-growth was well exposed by this incision, and its entire circumference easily separated from the surrounding tissues, yet it was very soon demonstrated that the solid, constricting mass extended far above the reflection of the peritoneum. The dissection was, therefore,

suspended at this site and an oblique incision six inches long was immediately made in the left inguinal region for the exposure of the upper end of the mass.

The mass was found to extend to the promontory of the sacrum. The entire pelvic peritoneum, including that covering the uterus, Fallopian tubes, and ovaries, was studded with small nodules, which had precisely the appearance of miliary tubercles. It seemed to me that the diagnosis of a tubercular lesion was now established beyond a doubt. There were no peritoneal adhesions, and all of the organs mentioned were normal in appearance, with the exception of the minute millet-seed bodies on their surface. I immediately decided to excise that portion of the sigmoid flexure which was most abundantly covered by tubercles, together with the entire rectum, and to make an artificial anus in the left inguinal region. The sigmoid was cut across at the middle of its loop and both ends closed by purse-string sutures of silk. The dissection was now conducted from above downward to the point at which the dissection from below had been abandoned, the suture attached to the sigmoid was passed through the vaginal incision, and the sigmoid and rectum intact were withdrawn through the lower incision. A number of distinctly caseous lymph nodes were found in the hollow of the sacrum and rapidly removed. This appearance of the lymph nodes was considered to be additional evidence as to the tubercular nature of the lesion.

All bleeding-points were now secured, the free end of the sigmoid was sutured in the abdominal wound, abundant gauze drainage was inserted, and the external wounds closed. The vaginal wall and the perineal body were completely restored. The patient suffered severe shock after the operation, and on the fourth day developed a severe infection of the extensive wound. The drainage was efficient, however, and the patient gradually made a complete recovery. The artificial anus was efficient, and the patient gained rapidly in flesh and strength.

As I have already stated, the gross appearance of this

lesion, both before and during the operation, as well as the naked-eye appearance of the longitudinally divided rectum after hardening, was so suggestive of tuberculosis that I felt no doubt as to the diagnosis. In fact, this specimen was not examined microscopically until eight months after the operation, when I presented the patient and the specimen to the Cincinnati Academy of Medicine and made the examination as a routine procedure. I was much surprised to find the typical histological structure of colloid carcinoma.

At the time when the patient was presented to the Academy she seemed a picture of perfect health. Her cheeks were rosy, she was plump, and her muscles were firm. She had no aches nor pains, and said that she felt perfectly well. Indeed, she had enjoyed this very good health for six months. The artificial anus worked satisfactorily. Her bowels moved by habit twice a day, and there was no leakage so long as the stool was formed.

One month after her appearance at the Academy of Medicine she was again sent to Christ's Hospital, suffering from an acute obstruction of the bowels. This proved to be a temporary difficulty which was easily relieved by enemata, yet her abdomen contained fluid. After the fluid was withdrawn a movable tumor, the size of a cocoanut, was felt in the lower part of the abdomen. This tumor was believed to be a recurrence, but its origin puzzled us very much. Within two weeks it had doubled its size, and another movable tumor, the size of the original one, could be felt. She now began to lose ground very rapidly. Both tumors increased in size with amazing rapidity; her abdomen became greatly distended; her appetite failed completely, and she suffered great pain. She was tapped at frequent intervals. The patient died about one year after the operation.

Autopsy. On opening the abdominal cavity a most remarkable condition of metastasis was revealed. The large, movable tumors which had been outlined were found to spring from the ovaries. One tumor was fourteen inches in length and eight inches in diameter. The other was twelve inches

FIG. 1

Colloid carcinoma of the rectum. In centre of jar, lower surface of diaphragm thickly studded with metastases. In upper corner, small piece of omentum filled with metastases.

FIG. 2.

The uterus and ovarian tumors from case of colloid carcinoma of rectum. The structure of these tumors, also of mass in Douglas' cul-de sac, typical colloid carcinoma.

FIG. 3.

Colloid carcinoma of the rectum.

in length and six inches in diameter. The omentum was one huge mass of small nodules. The mesenteric glands were enlarged in places to the size of an adult fist. Nodular masses of equal size were found in the hollow of the sacrum. The uterus was normal in size. The diaphragm was completely covered by an incrustation of metastatic tumors. The liver, spleen, and kidneys showed no metastases, but the kidneys were in a condition of extreme hydronephrosis. Microscopic examination of the ovarian tumors, of the nodules in the omentum, diaphragm, and mesenteric lymph nodes demonstrated a structure identical with that found in the original tumor of the rectum, namely, that of a typical colloid carcinoma.

My chief reason for presenting this case is the unusual nature of the primary tumor. I have never before seen a carcinomatous tumor of the bowel, which has developed as a hard, uniform thickening of the entire circumference of the tube. This tumor involves the wall of the rectum to almost a uniform degree for six inches of its length, and the organ is transformed into a tube that might very well be compared to a flattened lead pipe with very thick walls. This tube was very rigid and non-collapsible when in a fresh state. The lumen of the tube was, unfortunately, firmly packed with gauze before it was placed in Kaiserling's preservative fluid, and has been thereby dilated to almost twice its actual size during life. As has already been stated, a No. 27 French scale urethroscope was forced into the lower end of the stricture with difficulty.

A second point of interest is the strong, naked-eye resemblance to tuberculosis. 1. The minute bodies which were scattered over the pelvic peritoneum could not be differentiated from miliary tubercles. 2. Large, caseous lymph nodes were found in the hollow of the sacrum. 3. The great predominance of fibrous tissue, the uniform involvement of a long segment of the bowel, and the appearance of minute nodules resembling miliary tubercles in the primary tumor of the rectum, all speak for hyperplastic tuberculosis of the bowel.

A third point that seems worthy of mention is the exceedingly rapid development of the solidly carcinomatous ovarian tumors from half a dozen minute miliary metastases on the peritoneal surfaces of each. These tumors were friable and almost jelly-like, as were all of the metastases, whereas the original tumor was hard as cartilage.

While the occurrence of carcinoma at the age of nineteen is not a rare condition, it is sufficiently infrequent to justify the inclusion of this fact among the unusual features of this case.

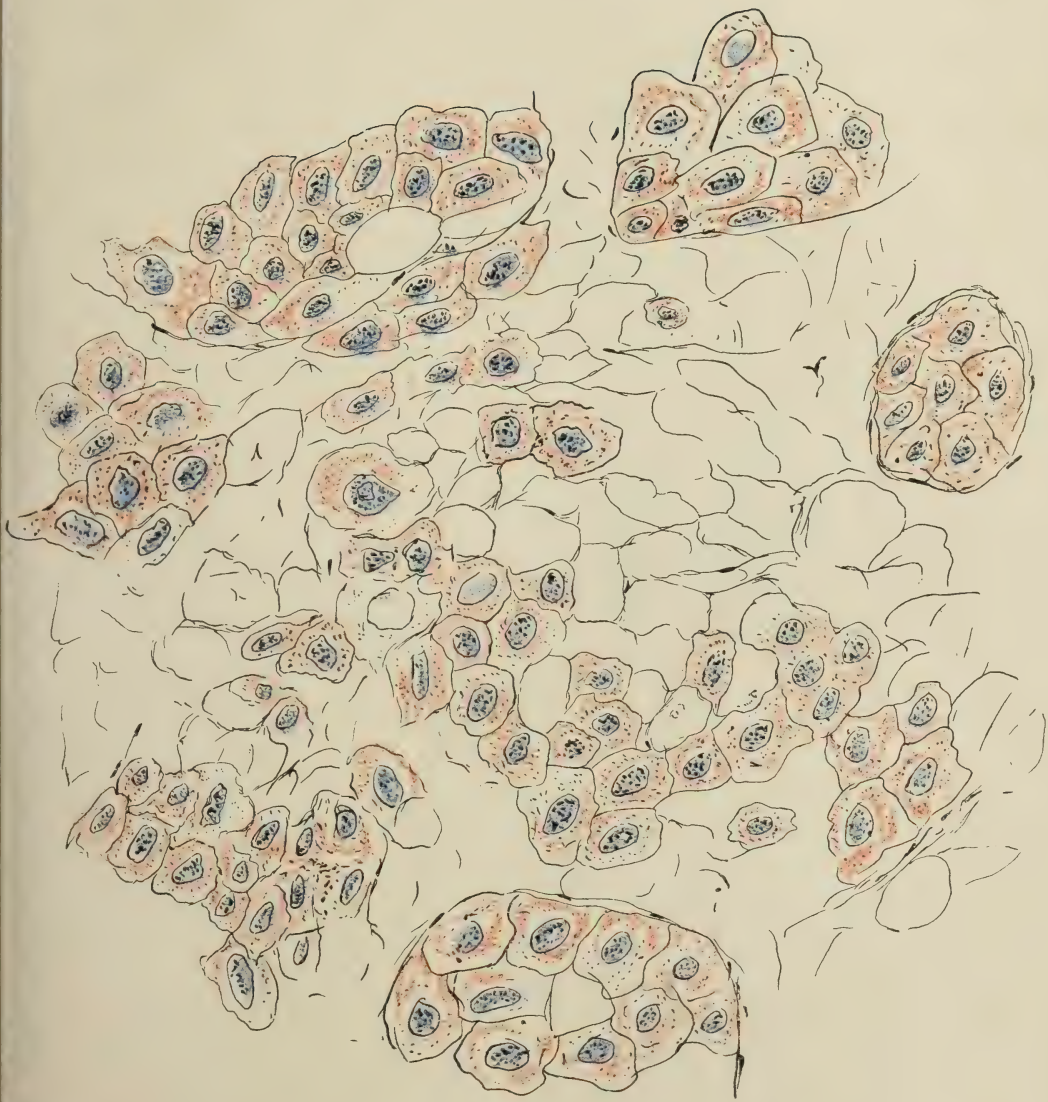
The technique of the operation should be briefly mentioned. The exposure of the lower half of this tumor mass was beautifully accomplished by the vaginal incision, and had the constricting tumor measured no more than two inches in length it could have been successfully removed by this route. A combination of the vaginal and the inguinal routes proved to be extremely satisfactory in the case reported, and is recommended for similar cases. The importance of the sacral lymphatic plexus is well illustrated by the case reported. All enlarged lymph nodes were removed, yet no effort was made to remove the entire lymphatic system of this region, and both local recurrence and general lymphatic extension occurred from this point.

The above report is presented solely as a contribution to the literature of this subject. No general conclusions have been formulated.

DISCUSSION.

Dr. W. L. Robinson, of Danville, Va.—In view of the difficulty attending the diagnosis in the case reported by the essayist, as to whether it was tuberculosis or carcinoma, I should like to ask why the bowel had to be resected, and why it was not brought down and stitched to the anus? Then, if the diagnosis was not correct, why did you wait so long before the removal of the tumor above?

Dr. E. A. Balloch, of Washington, D. C.—This case presented by Dr. Whitacre brings up one of the most pressing problems in present-day surgery; I mean by that the preferable route for approaching these malignant growths in the rectum.



Colloid carcinoma of the rectum.

One-sixth objective. Camera lucida tracing.

I think we all agree that the perineal route is only suitable for the selected early cases, and that being out of the question, there remains for us the Kraske method of approach and the combined abdominal and perineal, somewhat after the method of Weir. The Kraske operation has seemed to be an unsatisfactory procedure, involving a great deal of mutilation, and leaving, especially where the bowel is attached to the skin, great disfigurement and making the patient's condition very annoying and distressing, so that I think the combined abdominal and perineal route is the one for the future. It is not only a thorough and satisfactory method of approach and a very accessible route to reach these growths, but it also, as Dr. Whitacre has very well said, gives an opportunity of exploring the lymphatics in the hollow of the sacrum and of removing them in every case where necessary, and it is for this reason, I think, that Weir is to be congratulated on developing this original method of operating.

The case to me is extremely interesting not only on this account, but on account of the early age of its appearance in this patient. It tends to illustrate the pathological fact that the earlier the age at which these growths appear the more malignant they are liable to be. To mistake the condition for tuberculosis was natural, and this would occur first to anyone who saw this condition—the nodular character of the stricture combined with the minute growths.

Dr. O. L. Shivers, of Marion, Ala.—A few years ago I saw a patient who was operated upon by Dr. Lewis A. Stimson, of New York, the patient having been subsequently presented before the New York Surgical Society. He described the method of operating by cutting all around the cancerous portion of the anus, drawing down the rectum, and then suturing it to the tissues around. There were a good many surgeons who questioned the correctness of the diagnosis in that case, namely, that it was carcinoma, but microscopic examination verified the diagnosis. The patient was between twenty-five and thirty years of age, and the result was that he had perfect control of the anus.

Dr. Whitacre (closing).—This patient was urged by her family physician to go to the hospital for operation six or eight months previously, but she refused. She came for surgical treatment three days before I saw her, and was operated upon immediately.

In the diagnosis of this tumor I neglected to remove a piece for microscopic examination, largely because the diagnosis seemed fairly clear, because of the urgent demand for surgical relief. I did not think seriously of carcinoma in a girl of nineteen.

The question has been asked as to why we did not bring down the lower end of the bowel and attach it to the former

site of the anus. Fourteen inches of the bowel were removed, and it was impossible to bring the lower end to the anus. Indeed, we had just enough tissue left in good shape to make a satisfactory artificial anus.

While my experience in this line of work has been limited, I have had incontinence of feces after that method of operation which does not preserve the sphincter. The operation after the manner suggested by Murphy, which preserves the sphincter, seems to me very much better. In this operation the rectum is cut off an inch or more above the sphincter, and the upper end of the bowel is brought down and attached to the lower end, which includes the sphincter.

COMPLICATIONS MET IN THE SURGICAL TREATMENT OF DISEASES OF THE TESTICLE.

By J. McFadden Gaston, Jr., A.M., M.D.,
Atlanta, Ga.

In the surgical treatment of diseases of the testicle we may meet as complications hernia, varicocele, hydrocele, and other affections.

Having met with several such cases, my attention was directed to it as a subject worthy of consideration.

Case I.—W. H. E., aged fifty-eight years, had suffered from a double hydrocele which was tapped at one time and the contents removed, only to reappear. When I first saw him, in 1892, he was suffering from the effects of a very large accumulation on both sides of the scrotum, but larger on the left side, which was about as large as the head of a newborn child. This mass was tapped with a trocar and cannula and injected with Lugol's solution. Great swelling ending in suppuration following, an incision was made to evacuate the pus. The contents were foul and grumous, with pieces of disintegrated tissue and a piece of osseous material.

Dr. J. F. Binnie, of Kansas City, Mo., has studied the subject of myositis ossificans traumatica, and traces the formation of bony material to an inflammation of the muscles. In this case there was an inflammation of the cremaster muscles leading to the formation of this material. A full account of this subject, also containing this case among those

referred to by Dr. Binnie, may be found in the *Transactions of the American Surgical Association* for 1903.

The accumulation never reappeared on this side, but did not increase on the right side, so that it was not deemed necessary to carry on the treatment any farther at that time.

A considerable amount of trouble was experienced, however, in 1897, when a hernia appeared in the right inguinal canal. As there was some inflammation and considerable doubt as to the increased size of the canal, it was thought best to use an ointment of equal parts of mercurial, belladonna, iodine, and camphor ointments, after which a truss was adapted. On June 3, 1903, the patient presented himself with a mass which was red and very tense, evidently due to a descent of inguinal hernia, which had become irreducible. Having used taxis for a sufficient time to convince me of the futility of further attempts, I advised him to go to the Presbyterian Hospital, where I could operate. He consented, and was given a hypodermic injection of morphine sulphate, $\frac{1}{4}$ grain (0.015 gram), and atropine sulphate, $\frac{1}{150}$ grain (0.0004 gram.)

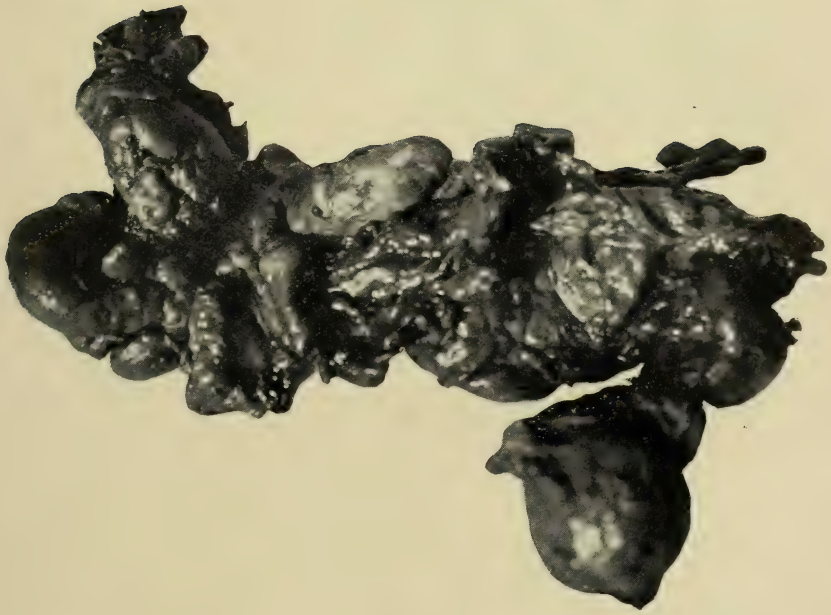
The next day, after having been shaved and the scrotum and abdomen prepared for an aseptic operation, he was anæsthetized. Beginning at the anterior superior spinous process an incision was carried to the region immediately over the internal ring. The Bassini operation was done with no important modification. In addition to the intestine a very large amount of omentum was found in the sac, and this was excised. There was also a considerable amount of serum and adhesion in the sac.

The intestine was œdematous and quite dark in color, but after warm cloths had been applied it became more natural. The knuckles of intestine were returned to the abdominal cavity.

Having accomplished this, the next step of the operation was to examine the testicle, which was found diseased and was removed, after ligating the veins and arteries leading

Fig. 1.

Case of inguinal hernia complicating hydrocele. After operation.



Specimen of omentum and degenerated testicle removed. Case W. H. E.

from and to it respectively. Kangaroo tendon was used to bring together the muscles and fascia on the inner side and the shelving portions of Poupart's ligament (deep), while the conjoined tendon was also included in the lower portion of this line of sutures. The cord was held out of place, but a suture of Kangaroo tendon was inserted above it before it was pulled out of its bed and connection with the fascia. Bull and Coley have found kangaroo tendon superior to silver wire or silkworm-gut, and I can testify to the satisfaction it gave in this case. The author of the operation, Bassini, has not performed as many operations, so far as we can learn, as Bull and Coley have, but has had only one death in 262 cases, while all but four were traced, and in all only seven relapses.

Bull and Coley do not recommend operations upon patients over sixty, and in none who are of extra heavy weight and obese. This was a case of emergency, and, although he weighed 240 pounds and had a considerable amount of fat, bore the operation well. He was in good health, however, and was a man of regular habits.

He will be presented to you in order that you may see the extent of the incision and the result of the castration. The incision measured about twelve inches after the whole line had healed.

The mass of omentum and tumor with testicle have been preserved, and may be seen to be larger than that usually removed, probably as large as a cocoanut.

CASE II.—A typical case of complication of hydrocele and cystic degeneration of testicle occurred lately in a patient in my service at the Presbyterian Hospital. W. M., aged thirty years, was tapped by Dr. J. Grant Wilkins several times, and the fluid recurred each time until he used an injection of carbolic acid. A painful testicle remained, and as there was some doubt he consulted Dr. Floyd W. McRae, who believed an operation was indicated to determine and remedy the extent of disease. I examined him at the Presbyterian Hospital August 4, 1903, and with the

history of fluid of a straw color which had been removed but returned probably six times, I determined upon a more radical operation, even stating to the patient that the removal of the testicle might be necessary. He agreed to the castration on one side, if thought necessary, after the condition of the testicle could be examined during the operation.

Knowing the tunica vaginalis testis was involved, and reasoning that at least a complete excision of it would be required to prevent a return of the fluid, this operation was at first contemplated.

On August 5, 1903, after the scrotum had been thoroughly shaved, scrubbed, and sterilized by antiseptic solutions and gauze, to prepare the field of operation, the patient having been given a hypodermic injection of $\frac{1}{4}$ grain of morphine sulphate and $\frac{1}{150}$ grain of atropine sulphate and etherized, the incision was made on the outer side of the scrotum on the left side. The tunica vaginalis testis was dissected away from the outer tissues, including the fascia, dartos, and skin, and the whole testicle was pulled down through the opening, leaving the smooth and tense surface of the tunica vaginalis testis. The tumor presented itself as a large, globular, fluctuating mass at the outlet of the wound. The trocar and cannula were now used to evacuate this collection of fluid, and then an incision beginning at the opening made by the trocar was made with a tenotome and enlarged by scissors.

A complication of a hydrocele and a cystic degeneration of testicle was disengaged from the surrounding structure, while the cord and veins were ligated and cut off with scissors.

The tunica vaginalis, which was very thick and considerably stretched, was trimmed off close to the internal ring, and then the edges brought over the ligated cord and vessels.

The wound was then closed, with the exception of a small place for drainage. The patient made a good recovery, and has been examined several times since so as to ascertain the reduction of the cord to normal size.

CASE III.—Another instance of complication with varicocele occurred soon afterward in my service at the Presbyterian Hospital. E. I. B., aged twenty-five years, was suffering from an enlargement of veins of the scrotum, and the baggy condition of the latter required the scrotum to be supported by a suspensory bandage. He had been examined by quite a number of physicians and surgeons, and finally came under the care of Dr. E. C. Cartledge, who had referred him to me. He had been a morphine habitue, and had been treated by Dr. Cartledge with hyoscine hydrobromate, abandoning the use of the opiate and whiskey. It was thought best not to give the usual dose of morphine and atropine under these circumstances and because he had already been given a small dose during the night. He was shaved and prepared as usual for the open operation by deligation and excision of veins and put under the influence of ether. On August 18, 1903, the operation was performed. He was very sick just before with a headache, a little rise of temperature showing itself, but the removal of the very much dilated veins also removed this nervous headache.

It was supposed that the scrotum would be supported sufficiently by the dartos, when the ends of the cut veins were attached, as the excision was done close to the globus minor. This proved to be the case, and he is doing well, having gone to work. His nervous system was deranged and he demanded opiates, but was never allowed them but at rare intervals.

The orchitis and epididymitis subsided, and he gained his spirits very rapidly.

In all of these patients we should investigate the causes of trouble, and I would urge an incision as indicated for a proper surgical treatment of complications in many obscure affections of the testicles.

Halsted's methods of the radical cure of inguinal hernia are very much simplified by the use of the implantation of the cremaster muscle and the closure of the internal inguinal

ring by it and the rectus fibres. While the usual advice is given by Bull and Coley that one method only should be practised by one surgeon because of the dexterity in operation to be obtained by practice, it seems that Bassini has proposed a method which is very easily applied to any case.

In the vast number of cases which have been treated, respectively, at the Hospital for the Crippled and Ruptured and Johns Hopkins Hospital, excellent results have been obtained by both methods.

A most important adjunct to the proper after-treatment and dressing of an operation for inguinal hernia is the spica bandage and the plaster-of-Paris spica bandage. The muscles are thus kept in a state of rest and quiet.

Another point in the management of a newly operated patient is the provision for some movement of the body, especially the placing of the patient on each side as often as twice daily, in order to prevent hypostatic pneumonia after ether. It was found in the case of the first man herein mentioned that he needed internal medication and constant attention on account of congestion of the lungs after an anæsthetic.

To Dr. H. O. Marcy is due the credit of introducing to the profession the virtues of kangaroo tendon, and any mention of the methods employed in the operative treatment of hernia would be incomplete without a due acknowledgment of his original and painstaking work as a pioneer in the steps that have been taken for the radical care of hernia. It is unnecessary for me to reiterate before this audience the words of H. O. Marcy[1] some years ago before this Association, but I do wish to say that his idea that "tendon suture is greatly to be preferred to catgut" has been tested, and the "kangaroo tendon has met with the unqualified approval of nearly every operator who has used it."

[1] Transactions of the Southern Surgical and Gynecological Association, 1892.

In the papers of both Dr. Coley and Dr. Halsted we find cases of hydrocele complicating hernia, while a hernia of the bladder and of the uterus itself are rare instances which have been encountered by them and others. It has been my aim to direct attention to the coexistence of hernia, varicocele, and hydrocele, and to discover their mutual relations. Where there is an omental development such as this man had, it is practically impossible to tell when the intestine is reduced by taxis, but, on the other hand, the adhesions make a protecting wall of omentum, serving as a cushion to the delicate intestine in the inguinal canal. Therefore, I conclude that it is a good rule, "When in doubt, operate." "When in doubt, operate," has been said to be the best rule in hernia, after having resorted to taxis.

There is a great deal of doubt right here in my mind as to how much effort should be made to reduce a hernia before operation is determined upon. I may say that while some surgeons advise only a few minutes of effort in this line, I used every possible means and nearly an hour before I came to the conclusion to desist.

T. S. K. Morton[1] took the position some years ago that castration might be adapted to cases of a certain character when operations for the radical cure of hernia were performed. He limited this plan to (1) certain cases of undescended testis, (2) some cases of congenital hernia, (3) certain cases of chronic or acute disease of the testis, (4) rare cases where traumatism has occurred to testis or cord, (5) in case of sloughing thereof, and (6) hernia in very aged persons.

DISCUSSION.

Dr. George R. Dean, of Spartanburg, S. C.—I have not had very much experience with the radical cure of hernia. I have only had two cases, one of which was a man seventy-three years of age. In his case I had to do an immediate operation

[1] Medical News, April 28, 1894.

on account of strangulation, and I thought it wise to make a radical cure. I removed the large portion of the omentum, which was in the sac, and did a successful operation with a gratifying result.

In regard to trouble with the testicles, I wish to report a case that came under my observation. A man in a railroad accident sustained an injury of the ribs and superficial muscles on the right side. In the testicle on the left side an abscess developed twelve months afterward. He brought suit against the railroad company for forty thousand dollars. When I saw him there was quite a discharge of pus from the testicle. I noted this condition for some time since. Finally, I laid the scrotum open and exposed the testicle. I removed all of the diseased tissue, washed out the cavity, and packed it with iodoform gauze. I tried to keep the parts in a thoroughly aseptic condition, still ulceration went on until possibly two-thirds of the stroma of the testicle was destroyed. In consultation with several other physicians it was decided to remove the testicle, which was done. The patient recovered from this operation and gained in flesh rapidly. Six months afterward he married a buxom woman. In about thirteen months he came back with the other testicle in the same condition. I treated that testicle for a month or six weeks as before, but the patient seemed anxious to have it removed. I did not know what his motives were; but I told him I would not remove it then, but would send him to Atlanta to see Dr. J. McFadden Gaston, Dr. Westmoreland or Dr. McRae, to hear what any of those gentlemen had to say. This he refused, and after consultation this one was also removed.

In talking with the man about losing his sexual power after the removal of the first testicle, he said it did not make any difference, so far as he could determine. After the last testicle was removed the man regained his health, and since then has been healthy.

In the last year he has shown a disposition to break down physically. This, however, has no connection with the injury primarily. Investigation has shown that both testicles had undergone tubercular degeneration.

The point in this case is the design of the patient in giving up both testicles so readily, evidently to get damages from the railway company. He claims impotency from date of the railway accident; but the fact that there was no evidence of any injury to the spinal column and no paralysis of any part of the body, and that he worked more or less after the accident during a period of twelve months, and that six months after the loss of the left tesicle he married a fine, healthy girl, all go to prove that he was malingering. Then, too, just as soon as the abscess appeared in the remaining right testicle he demanded

its removal, not wishing to try any other than radical treatment. All this went to prove the man's desire to give up his testicles and his wife, as it turned out, with the hope of receiving heavy damages from the railway company. In this his failure was complete.

Dr. W. P. Carr, of Washington, D. C.—I have taken out a great many testicles for different purposes. I always prepare myself as well as possible for future trouble, and I think it is always well to do so. In the first place, it is a wise precaution to have a consultation with other physicians; in the second place, to preserve the testicle after it has been removed in case any trouble should arise afterward. In one case I know I was saved a lawsuit by the fact that I had the testicles in my possession. They were very badly damaged tubercular testicles, and when the man found I had them to show and that he had no basis for his suit, he dropped the suit. This was the only case in which I was ever threatened with a suit for malpractice.

A friend of mine in Washington removed a man's testicles for hypertrophy of the prostate, and that man has been going around town with a pistol looking for the doctor.

A great many men go to surgeons and say they want their testicles removed; that they have no sexual power, but just as soon as it is done and they have regained their general health, they are liable to bring suits for malpractice We are likely to have accidents in operating upon the testicle, particularly in cutting off too much of the blood supply from the organ in operating for varicocele or hydrocele. In two cases in operating for hydrocele with very large sacs, I have cut off too much of the blood supply from the testicle, consequently the testicle has become gangrenous and has sloughed. Even with the greatest care in operating for old hydroceles, in trying to separate the sac from the cord we are very liable to cut the vas deferens, and in a case I operated upon a few hours before I left Washington I did that. I carefully separated the vas deferens and pushed it over to one side, so that I would not cut it, then picked it up in a fold of the sac and cut it in two. It happened to be an old colored man, and he will never know the difference.

Dr. Robert W. Johnson, of Baltimore.—I would call the attention of the members of the Association to the possibility of gangrene of the testicle occurring spontaneously. I have had the good fortune to see one of the sixteen cases that have been reported in medical literature. A man, a cornet player by profession, was sent to me and presented almost all the symptoms of a strangulated hernia. There was a very tender condition over the scrotum, with great enlargement of both the scrotum and cord, and I prepared the patient for an operation, and operated for strangulated hernia. When I got down to the testicle I found it was gangrenous, due to a twist of the cord.

This is a rare condition. Among other causes mentioned as the reason for its occurrence is one that suggests itself to me, namely, spasmodic action of the cremaster. This man in blowing his cornet was forced to use great expiratory effort, and with the spasmodic action of the cremaster turned the testicle on its axis, and retaining it there caused the blood supply to be cut off and resulted in gangrene of the testicle.

Dr. Gaston (closing).—A few words in regard to sloughing of the testicle, as mentioned by Dr. Carr. It is a frequent complication, and very hard to guard against in the treatment of the testicle, and I am not surprised that it should have occurred. Sloughing is generally regarded as one of the easiest things to occur in connection with the surgical treatment of this organ. I think the doctor was very fortunate in removing it as well as he did.

I am glad the case Dr. Dean referred to did not come to us, as such cases are not satisfactory to deal with, and for that reason I felt it was worth while to mention the various complications that may occur in connection with these cases. In the case mentioned there was sloughing of the left side, due to the injection of Lugol's solution. I put the man off, and was afraid to inject the other side, and I have made it one of my first rules of procedure in the future not to inject a hydrocele unless I am absolutely certain as to the character of its contents, and, therefore, it was to prevent sloughing in the other cases that I cut down and performed a more radical operation for hydrocele and dealt with the complications; in the second case I referred to I think the same thing would have occurred (sloughing) if injections had been persisted in.

Dr. Carr has mentioned loss of virility in the case of the old man. I will say in regard to my patient whose testicles were both involved, that just before operation, for eight or nine years he seemed to enjoy the full power of his sexual propensities, but since the removal of the right testicle there has been very little sexual power.

THE REGULATION OF THE DURATION OF EXPOSURE AND THE DISTANCE FROM THE TUBE IN X-RAY THERAPY.

By Ennion G. Williams, M.D.,
Richmond, Va.

The first question an *x*-ray operator has to determine is at what distance shall the tube be placed from the patient and what shall be the duration of the exposure.

In the literature on this subject there is an especial want of observation on these practical points. One can readily see why such details have not been given. The component parts of different machines and tubes vary. Every outfit has its several variable and controlling factors, different combinations of which bring about a different quality of *x*-light with its corresponding effectiveness. A great deal has to be learned by experiment and experience with each outfit. Fairly definite directions, however, can be given in regard to these factors, even if they be only general and relative.

If we fix the other controlling factors and make them constant we can with a fair degree of accuracy prescribe the treatment measured in time and distance.

Besides the latter two we recognize in every outfit as controlling and variable factors the degree of vacuum of the tube, the resistance in the circuit, and the quantity of electricity (amperage). The penetration of the light is dependent upon the degree of vacuum and the resistance in the circuit, and the intensity is dependent upon the quantity of electricity.

The degree of vacuum and the resistance can be regulated and made constant factors by means of the vacuum and spark-gap regulators. The volume of electricity is governed by the speed of the plates in the static machine, and in the coil by the speed of the interrupter and the current supplied to the primary. These can be governed by the regulators provided for the purpose.

If we render constant the penetrating quality and the intensity of the light we need then consider only the time and distance.

The accompanying table is given to show the relative effect at different distances, based upon the rule that applies to all forms of radiant energy, that the intensity varies inversely as the square of the distance.

Distance.		Relative intensities.		Safety limits.
2	1	1.	25.	2.5
4	1/4	0.250	6.25	10.0
6	1/9	0.111	2.77	22.5
8	1/16	0.062	1.56	40.0
10	1/25	0.040	1.00	62.5
12	1/36	0.027	0.69	90.0
14	1/49	0.020	0.51	122.5
16	1/64	0.015	0.39	160.0
18	1/81	0.012	0.30	202.5
20	1/100	0.010	0.25	250.0

In the first column are the distances at two-inch interval. In the second are the relative intensities expressed in fractions. In the third are the same expressed in decimals. In the fourth are the relative intensities expressed in decimals, taking the intensity at ten inches as unity. This column is useful, for since ten inches is the average distance for an exposure, when one wishes to estimate the total amount of treatment given he can by means of this column reduce the exposures which may have been given at various distances to their equivalent at ten inches, and then add the number of minutes. In the fifth column are the safety limits or the duration of time which it is safe to expose a patient without danger of a dermatitis. These

figures are the result of an experience of nearly two thousand exposures personally given and by experiments in bringing about a redness of the skin by a continuous exposure. The figures are about one-half those required to produce a moderate degree of redness of the skin of the forearm with a tube of medium penetration and a current supplied to the primary of one ampère and fifteen volts with an equivalent spark gap in the secondary circuit of five inches.

I have found the column of safety limits a valuable guide in radiographic work, and the knowledge that approximately twice the duration of these exposures under the conditions that I can regulate will produce a dermatitis has been of great value in directing the treatments.

Every outfit as well as the different combinations of the controlling factors will have its respective length of time to produce a dermatitis. Every operator should therefore at first try to determine this point. He can thus avoid undesired and unlooked-for results and foretell by several days the effects that occur.

The fear of unexpected and harmful results has been too much exaggerated. There is no more reason why we should fear the danger from the rays than from strychnine. Both are powerful therapeutic agents capable of regulation. They should be prescribed and used within their limits and according to the indications.

The treatment of deep growths require especial attention to the time and distance. The difficulty in reaching them has been the danger of injuring the superficial tissues before the deep growths are affected. Since we know it is not necessary to bring about a necrotic inflammation to destroy a cancer, and if we can have the rays penetrate the tissues with moderate uniformity, we can then hope to destroy the deep growths. The closer the part is to the tube the greater is the difference in the effect upon the skin and the part beneath. For instance, suppose we have a growth four inches from the surface and the surface four inches from the anode. According to our table the effect on the

skin would be represented by 0.250 and that on the growth 0.062, or a difference of 0.188. Of course, this does not take into consideration the loss of intensity due to penetrating the tissues. If now the surface of the skin be placed at eight inches the growth will be at twelve ; the relative effects will be 0.062 and 0.027, or a difference of 0.035. With the skin at sixteen inches and the growth at twenty the relative effects are 0.015 and 0.010, with a difference of 0.005. We thus see that the farther the part is from the tube the less is the difference between the effects on the skin and the part beneath. We should therefore place the part far off and make due compensation by increasing the duration of exposure directly as the square of the distance, or by referring to the table one can determine the duration for the exposure. My rule is not to expose in ten days more than the number of minutes required to produce a dermatitis. As this point is approached the exposures are shorter and at longer intervals, in order to watch developments. As soon as the redness is reached and its degree determined the treatment can be continued and directed according to the indications.

I realize that in the above remarks there are vulnerable points, but it is a tendency toward a more rational technique based upon a physical law. The sooner we bring our techniques under fixed laws the more uniform and more successful will be our results.

REMOVAL OF PSOAS AND ILIAC MUSCLES OF THE LEFT SIDE FOR SARCOMA.

By George H. Noble, M.D.,
Atlanta, Ga.

On July 5, 1901, I removed the uterus and appendages of Mrs. J. E. F. for adenocarcinoma of the cervix. The ulceration was confined to the posterior wall of the cervical canal. With this exception the portiovaginalis looked to be in a fair condition. There were no signs of extension of the disease beyond the limit of the uterus. It therefore appeared to be a favorable case for operation.

The progress of the case was very satisfactory for eighteen months after hysterectomy. She then experienced pain in the left inguinal region extending along the anterior crural nerve, and later she discovered three small nodular, inelastic and immovable masses between the anterior superior spinous process of the ilium and the promontory of the sacrum. At this time the left thigh became sharply flexed upon the abdomen, and fixed by contraction of the psoas muscle on that side. The pain was severe, and unless profoundly impressed by morphine she was unable to change her position without suffering, even when assisted by the nurse.

On physical examination the mass above mentioned was easily detected at the bifurcation of the iliac artery on the left side, projecting above the brim of the pelvis, shading off externally into an imperfectly outlined boggy mass, and extending two and a half inches from above downward and outward in the course of the psoas muscle. The femoral

pulse, when compared with the other side, was found to be unchanged. The pelvic examination was negative. She complained of nausea, loss of flesh and strength. Temperature, 100°; pulse, 100.

I advised exploratory operation and removal of the mass to give temporary relief from pain and flexion of thigh.

She returned March 6, 1903 (twenty months after hysterectomy). There was marked loss of flesh, increase of pain, and decrease in size of the left thigh and leg. They appeared to be a third smaller than the other side. No measurements, however, were made.

The mass had lost its nodular feeling and presented a semielastic and boggy sense to the touch. It had increased fully 100 per cent. in size and extended an inch farther externally. The femoral pulse was obliterated, but collateral circulation seemed to be well established. The pelvic examination proved negative. Temperature, 100°; pulse 126.

The condition was much worse, and she requested the operation, expressing the wish that she might die under it. So it was undertaken March 11, 1903.

The abdomen was opened for the purpose of exploration, to search for recurrence of malignancy in the deep pelvis, and to ascertain if the intestines were involved in the mass on the pelvic brim. The deep pelvis proved to be absolutely free up to the bifurcation of the iliac vessels, but there the internal iliac glands on the left side seemed to be the centre of the growth.

The abdominal and pelvic viscera being free, the incision between the recti muscles was closed and a curved incision, four inches long, was made in the left inguinal region an inch and a half from the ilium. This incision was bisected by a line drawn from the anterior superior spinous process to the umbilicus.

I cut down upon the peritoneum and pushed it off for some distance beyond the extremities of the wound and inwardly far enough to completely clear the mass and elevate the ureter and hold it out of the way with a long retractor.

Knowing the collateral circulation was established through the internal iliac artery, it was my intention to remove the external iliac with the mass, as there was no pulsation on the distal side; but in my efforts to liberate the internal iliac a softened point in the Y of the bifurcation was lacerated. This required ligation of the internal iliac above and both its anterior and posterior branches below the point of injury.

Very little difficulty was experienced in this step of the operation, even though the work was all extraperitoneal. On account of obstructing the collateral circulation by ligation of the internal iliac artery, it became necessary to preserve the external iliac artery through which some blood must have passed, though it was impossible to detect pulsation below the mass. This vessel was rapidly liberated by a blunt dissection from the bifurcation downward, and as soon as the mass constricting it was removed pulsation began in the femoral artery. The calibre of the external iliac remained diminished about one-half.

Dissection of the anterior crural nerve was tedious, the mass having surrounded it completely. However, it was eventually accomplished. The external iliac vein was entirely obliterated and no collateral circulation could be found above the deep epigastric vein.

After freeing the vessels and nerve and pushing the ureter and colon aside, the bulk of the mass was turned out by blunt dissection; forcing the hand down the iliac fossa behind the psoas and internal iliac muscles, following closely the contour of the bone, separating from below upward, the muscles were severed at Poupart's ligament and the lower end brought out of the wound. Then the fingers easily slipped along the psoas muscle to its origin at the transverse processes of the lumbar spine, from which it was cut by curved scissors.

The wound then appeared like an enormous pocket, and required gauze drainage, as the abdominal viscera was unable to force the peritoneum deep enough to fill it.

The mass proved to be sarcoma,[1] originating in the iliac glands and extending to the left psoas muscle. The growth of the disease was rapid after involving the muscle, which at the time of the operation began to show signs of breaking down. The muscle was converted into a spindle-shaped cavity containing about an ounce and a half of peculiar milk-like fluid.

The patient's recovery was slow, but the relief she received by this operation was well worth the undertaking. The pain was relieved and the flexion and fixation of the thigh upon the abdomen was overcome, but she was left with very little power of flexing the limb. This, however, should be expected in such circumstances.

The interesting features are: first, removal of the psoas and iliac muscles; second, occurrence of carcinoma and sarcoma in the same subject; third, extraperitoneal ligation of the anterior and posterior branches of the internal iliac artery.

On making inquiry at the Surgeon-General's library I was informed that nothing of the kind has ever been done. Therefore, this is, in all probability, the first removal of these muscles.

[1] Though it is difficult to differentiate between carcinomatous metastasis in the lymphatic glands and lymphosarcoma, the above specimen was examined by a competent pathologist, who was satisfied with his findings.

A SUGGESTION IN OPERATIONS FOR HYPOSPADIAS AND A METHOD TO PREVENT THE CLOSURE OF THE NARES IN RHINOPLASTY.

By E. Denegre Martin, M.D.,
New Orleans, La.

I. Hypospadias.

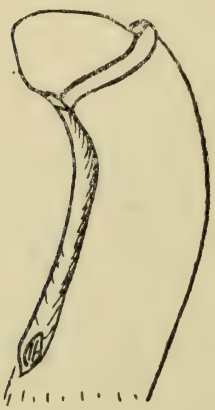
Only surgeons who have had any experience in operating for congenital deformities of the penis can fully appreciate the difficulties to be encountered, notwithstanding the numerous methods suggested, none of which seem to be ideal. After repeated failures in attempting to carry out some of the existing methods, I finally decided upon a plan which proved most satisfactory, and which I believe likely to give the best results in similar conditions, as illustrated by the following case:

C. H., white male, aged twelve years, was referred to me for operation. On examination I found a condition of complete hypospadias with undescended testicles. The urethral opening appeared in the perineum about one inch above the anus, and continued as a narrow band of mucous membrane the entire length of the penis to the site of the normal meatus, as represented in Fig. 1.

After making several attempts to restore the urethra, first, by the method of Rochet, of making a tube from the skin of the scrotum and carrying it up under the skin between the corpora; and second, by the suggestion of Novê-Josserand, of making a tube with a Thiersch graft, sutured over a

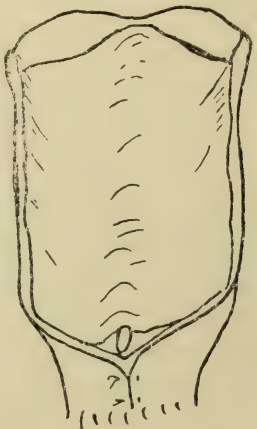
catheter and run under the skin, and meeting with only partial success by the first method, I decided to divide the corpora and cover the surface with a single Thiersch graft, this forming, when brought back into normal position, a deep groove, covered with healthy skin and continuous with the existing urethra. The edges were split, brought in apposition and so sutured as to form the new canal, and the skin was then brought over these flaps and held in apposition with mattrass sutures, reinforcing the new canal, as represented by the cuts.

FIG. 1.



I

FIG. 2.

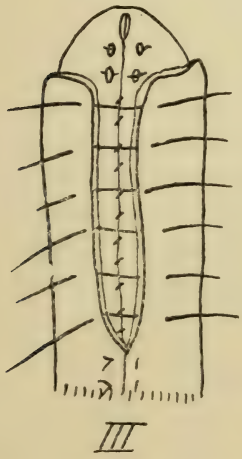


II

The technique of this operation is as follows : First divide the corpora, at the same time dissecting out the remnants of the unformed urethra and removing the bands which usually exist and cause a curvature of the penis (see Fig. 1). The division of the corpora should be almost through their entire thickness, so as to insure a deep groove and a roomy urethra. Dissect out the meatus of the existing urethra and carry it to the bottom of the groove, so as to make it parallel with the new urethra; flare out the corpora and cover the raw surface with a Thiersch graft; cover with gauze; strap to the pubis with adhesive strips. In ten days

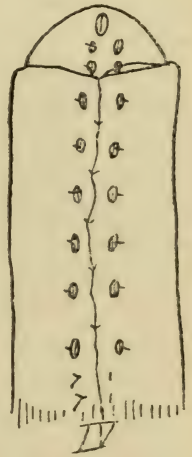
or two weeks the graft will have taken, then the second step of the operation can be performed. Second, split the edges of the skin at the junction of the grafted surface and dissect back a quarter of an inch on each side; place a catheter at the bottom of the groove, insert into the urethra, and suture the margins of the grafted surface over the catheter with catgut to form the new urethra. Reinforce this with the skin-flaps and hold in apposition with silk-worm-gut sutures, run through at least a quarter of an inch from the edge of the flap, and held in position with shot,

FIG. 3.



III

FIG. 4.



IV

care being taken not to make tension on these, but simply to approximate the opposing flaps. The operation can be completed by a continuous or a few interrupted sutures, as the case may require. Remove the catheter.

Perineal drainage is absolutely necessary through every step of the operation.

The advantages of this method are: that it is less complicated, assures a healthy urethra, of which fact you can be absolutely certain before closing, and undoubtedly requires fewer operations to complete the work, with much less risk of failure from gangrene of the flaps or rupture of the suture.

Fig. 2 represents the appearance of the penis after grafting. Fig. 3 the first step in formation of the new urethra. Fig. 4 the approximation of the skin-flaps.

My experience is that the fewer sutures used the better, and they should never be drawn tight, as there is more liability of cutting through the tissue when the penis becomes congested—a condition that is certain to follow and always fraught with the greatest danger to the operation.

II. Rhinoplasty.

In all plastic operations nothing is of greater advantage to the surgeon than a personal experience with many cases. In rhinoplasty American surgeons have little experience, except in cases resulting from syphilis or lupus, which render the technique much more difficult on account of the enormous amount of scar tissue resulting from the ravages of the disease. In India, where mutilation is resorted to as a means of revenge, the deformity is common enough. Until recently the technique was imperfect, but since the advent of aseptic surgery it has been greatly improved. Metallic supports have been used, but only in exceptional cases have these proven beneficial, and osteoplastic operations have been only partially satisfactory.

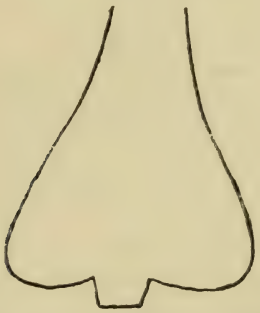
One of the following methods is usually employed: The Italian, by which a flap from the arm is attached to the stump. The French or German method, in which flaps are taken from the cheek; and the Indian method, by which a flap is taken from the forehead.

This last is the method usually adopted. A flap is cut from the forehead with its pedicle near the supraorbital notch. The base of the flap is so shaped as to form a columnar. It is then twisted upon its pedicle, brought over the nasal orifices, and held in position by interrupted sutures, and the projection in the centre at the base attached to form the columnar. This leaves a margin of raw surface along the border of the newly formed nares, which naturally contracts as the healing process progresses, and

is always a source of great annoyance to the surgeon and patient as well.

To overcome this difficulty I would suggest the following plan :

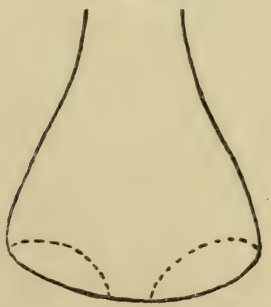
FIG. 5.



Shape of flap in Indian method.

First, it is essential that the entire surface to be grafted should be healed ; that the nasal orifices be sufficiently patulous to allow of the free passage of air ; if contracted

FIG. 6.



Shape of flap suggested. Dotted lines show where flap should be thinned and inverted. When drawn back and held by mattress sutures the flaps pull up the centre and form columns.

they should be enlarged and grafted with Thiersch grafts, and this should also be done when the scar tissue appears unhealthy. Being thus properly prepared, a flap is cut from the forehead obliquely from right to left, with its pedicle

near the supraorbital notch. Instead of so shaping it to form the columnar, the base is cut broader and longer than in the method usually suggested. After removing the flap it is thinned on either side of the columnar and inverted, thus forming the new columnar, and at the same time grafting the orifices of the nares with normal skin-flaps, which will overcome the danger of contraction and the obliteration of the nasal orifices. The rest of the technique is the same as suggested by others. The method is quite simple, and has proven most satisfactorily in two cases.

The first case in which I adopted this plan was one in which the entire nose had been destroyed by syphilis. The operation was performed before the lesions were entirely healed. The result was that contraction continued after the new nose was made and almost obliterated the orifice. This condition could have been obviated by grafting, and the ultimate results would have been far more satisfactory.

The second case was that of a colored man who had lost his nose and both eyes from a gunshot injury. Though I did not see the patient after operating, I was told the case had done admirably.

HEPATECTOMY FOR TUBERCULOMA OF THE LIVER.

By Joseph Ransohoff, M.D., F.R.C.S. Eng.,
Cincinnati, Ohio.

The operative treatment of surgical affections of the liver has been the outgrowth of the past two decades. Although abscesses and cystic growths had long been treated by surgical intervention, the surgery of solid neoplasms necessitating resection of the liver was not undertaken until the experiments of Tillmans, Ponfick, Gluck, and Cecherilli had demonstrated the compatibility of even large resections with continuance of function and the further demonstration of the rapid degeneration of the liver tissue. Since Lins, in 1886, and Langenbuch, in 1887, removed large movable portions of a corset liver, many operations have been performed upon this vascular gland. The most complete compilation of cases thus far published is that prepared for Keen by Spencer, Cushing, and Downes.[1] The cases of resections numbered seventy-six in 1889. Cases have since been recorded by Elliot,[2] Beck,[3] Kocher,[4] Fillipini,[5] Tricomi,[6] Langer,[7] Legueu,[8] and Nauman.[9]

In gleaning the literature of this subject it becomes apparent at once that it is difficult to make a distinction for statistical purposes between cases in which the liver tissue is merely incised for the removal of an enucleable growth and those in which a considerable portion of the liver tissue wherein the neoplasm is embedded is the essential feature of the operation. Keen has carefully attempted to exclude cases of hepatotomy, including in his table only cases in

which resection was done. According to this table the mortality of all liver resections is 15 per cent. According to the statistics of Terrier,[10] there died from the operation 10 out of 42 cases—mortality 19.23 per cent. An analysis of the last 17 cases of Spencer and Cushing's table will show that resection for carcinoma has a mortality of 50 per cent. Of these cases recorded only 3 recovered entirely from the operation; 1 died on the third day, 1 after six weeks, and 1 after three months.

Doubtless a number of cases reported as recoveries after resection for carcinoma have in reality been cases of gumma. Such, for example, was the fact in the celebrated case of Lucke, in which he removed the left lobe of the liver. Madelung[11] subsequently showed the tumor to be a syphilitic gumma. This perhaps accounts for the permanence of the cure. Elliot states that of 9 cases operated on for syphilitic tumor only 2 died. According to this writer, in 12 cases of malignant disease recently resected—8 for carcinoma and 4 for sarcoma—1 died from the operation and 2 were known to have no recurrence at the end of two years. One of these is the case of Lucke already alluded to. The case of Fillipini resected for adenoma had a recurrence after three and a half years. From personal communications from Keen, Elliot, Monks, and Beck, I am enabled to report that there was a recurrence in each. Including the cases of Beck and Kocher—1 death and 1 recovery—and the one recorded below, supposed primarily to be cancerous, there are 16 cases with 3 deaths. In all of these cases the growth was supposed to be, as it of necessity must be if at all operable, primary and in the form of a single tumor. That this is not always possible will be shown in the following case. If one considers the fatality of solid tumors of the liver, excluding gummata, the statistics presented, although far from promising for the permanence of the recovery, may still justify resections for solid tumors of the liver limited in number and position. On resection of the liver for solitary tuberculoma I have been unable to

find any literature. Believing that in a field of surgery where justification of operative interference and the technical methods are still somewhat debatable, every case, especially if unfavorable in its result, should be recorded, I beg to submit the following report:

Male, aged thirty-six years; first examination, October 18, 1903. Admitted to the hospital on October 21, 1903. Both parents are living and in good health. Brothers and sisters all living. History as to lues negative. Ten years before the onset of the present malady, had the left testicle removed for tuberculosis. Since then the patient has been in excellent health until four months ago. He has been married six years, and has one child a year old and healthy. There is no history of miscarriage. In November, 1902, the patient consulted me once for a pain in the right loin, which proved to be an ordinary lumbago. During the past four months he experienced a sense of weight and then of pain in the pit of the stomach. This he believed to be some form of dyspepsia. Although spare of habit, the patient has noticed some little loss in weight. He has not vomited during his illness nor has he been nauseated at any time. In the past two months he noticed a tumor growing under the tip of the sternum.

Physical Examination. Man of sallow hue of skin, but without traces of lues; weight, 120 pounds; heart and lungs normal; urinalysis normal. On examining the abdomen a tumor is at once seen in the epigastric region. It can readily be palpated through the thin abdominal wall. It is irregular in outline, its long axis corresponding to the border of the left lobe of the liver. Its short axis, which is about two inches long, has its upper end removed about two inches from the tip of the sternum. The tumor seems very movable. It moves very distinctly with respiration. The percussion note over the tumor is distinctly dull, and the dulness is directly continuous with that over the liver. Below and to the left the dulness is sharply defined against the tympanitic resonance of the stomach and intestines.

Examination of the abdominal viscera, including the rectum, reveals nothing abnormal. An examination of the stomach by Dr. Ramsey showed it normal in motility and secretion.

Diagnosis. Tumor of the liver, probably primary in character and of cancerous nature. This diagnosis was concurred in by Professors Osler, Hare, and Forchheimer.

Operation, October 23, 1903. Ether narcosis. An incision in the midline from the ensiform cartilage downward and about four inches in length at once revealed the tumor, which was embedded in the left lobe of the liver. The omentum was adherent to the free border and was secured and divided between double ligatures of fine silk. This accomplished, the pylorus and most of the stomach was carefully examined and found free of disease. No lymph nodes were found in the lesser or gastro-omentum. What was felt as the tumor mass was now found to be the left lobe of the liver, hardened and nodular on its lower surface, but quite movable. Since the tumor appeared malignant and therefore unsuited for enucleation, I determined to remove it by resection if I could be reasonably certain of its being a solitary growth. To this end an oblique incision three inches in length was made to the right. All of the under and most of the diaphragmatic surfaces of the liver were thereby placed within touch. A second tumor was not felt.

By gentle traction the left lobe of the liver was brought into the abdominal wound. It was difficult to hold it. I therefore concluded to follow the method adopted by Lucke and others, with success in completing the operation in two sittings. To this end two large blunt-pointed bullet probes were passed at right angles through the thickness of the liver an inch or more beneath the tumor mass and an elastic tube thrown around the liver to form a pedicle. The lower part of the wound was closed in the usual way, the upper lightly packed with gauze. The patient left the operating table in excellent condition; pulse, 82.

24*th.* During the morning the dressings became saturated with blood. When they were removed it was found that a quite profuse bleeding was going on. There was great thirst; pulse, 120. Under ether anæsthesia the wound was examined and the source of hemorrhage sought. It was found that the elastic tourniquet had forced the skewers through the liver tissue, thus producing slight lacerations from which the hemorrhage came. The band was therefore removed, and by means of one of the skewers a very heavy ligature was made to take its place. There was no further bleeding. With the thermocautery the left lobe was now cut away, without the further loss of even a drop of blood.

During the first forty-eight hours after the operation the condition of the patient promised much. There then supervened a vomiting and hiccough which could not be controlled. From the third day the vomitus consisted chiefly of blood. There was neither pain nor abdominal distention indicative of peritoneal infection.

Death followed on the sixth day after operation, probably from necrosis of the gastric mucosa from retrograde thrombosis of the omental veins.

A partial autopsy was made. Dr. Carl Hiller reports on this and on the nature of the tumor as follows:

The excised piece of liver is cone-shaped, with the apex representing the extremity of the left lobe, and the base artificially produced by the incision with the thermocautery. This base measures 32 cm. in circumference, 9½ cm. in its longest and 8 cm. in its shortest diameter. The piece weighs 280 grams. The surface is smooth and unaltered, except at one portion, which, when the liver was undisturbed in the abdomen, was on the under surface close to the anterior sharp margin. Here and there is a nodule of grayish-white color standing out in bold relief against the surrounding liver tissue, which is of a normal color and consistence. The nodule, when a cut is made into it at right angles to the surface of the liver, presents an ovoid

surface of firm consistence throughout and is sharply defined from the adjacent liver substance. This nodule measures on its cut surface 23 mm. in its shortest and 26 mm. in its longest diameter.

After death, on examination, the remaining portion of the liver showed that where the elastic band had compressed it there was much discoloration. Other than the presence of a similar nodule, half the size of the one already described, nothing abnormal could be detected. This nodule was in the right lobe, on the upper surface of the liver, close to where the peritoneum is reflected from the upper surface of the liver to the under surface of the diaphragm. With the exception of a slight inflammation about the stump of the liver, nothing abnormal could be detected in the abdomen.

An examination of the specimens made from the nodule with the microscope reveals connective tissue in large amount. Both fully developed and forming connective tissues are found. The youngest connective tissue is represented by loosely packed spindle cells which lie by the side of cells with large vesicular nuclei. These are believed to be epithelioid cells derived from connective cells. Here and there, but not very frequently, can be noticed a giant cell with peripherally situated nuclei and a degenerated centre. Bloodvessels exist only as capillaries which are limited to the outer portions of the nodule. It is here that the nodule is most cellular, so that the appearance of granulation tissue is presented. Separating the granulation tissue from the most central portion of the nodule are more matured connective fibres, which at places are quite dense.

The centre of the nodule is made up of a homogeneous, necrobiotic area of large extent, which contains here and there a few cellular elements.

The diagnosis of solitary tubercle was made, although the tubercle bacillus could not be demonstrated in the specially stained sections.

Remarks. In connection with the case reported, I would direct attention to two questions, one involving that of diagnosis, the other that of the technique to forestall hemorrhage.

The diagnosis before operation was that of primary hepatic tumor. This was made with the full knowledge of the great rarity of such tumors. Kehr in 600 laparotomies found 1 of this nature. Of cancer not more than 1 in 64 is primary. Man[12] found 246 secondary and only 4 primary cancers. The most extensive manual and visual examination of the liver possible at the time of operation failed to reveal a second growth. Nevertheless the autopsy showed such a lesion in the right lobe of the liver, where it could not be felt intra vitam. The very serious difficulties hampering the pathologist in coming to a conclusion as to the nature of the growth when diligent study of sections are made will show the difficulty of the operator in determining the nature of a solid growth while the operation is in progress. At the time of the operation it was believed that the tumor herewith presented was a primary carcinoma. A more careful examination makes it almost certain that the case is one of large tuberculoma. Solitary tubercular tumors of the liver, although described by pathologists, are exceedingly rare. I believe this to be the first case in which a resection of the liver was made for a tubercular tumor.

In regard to the technique of hepatectomy, it may not be laid down as a rule that immediate closure of the abdominal wound is to be condemned. In the cases of Langenbuch and Wagner severe secondary hemorrhage followed this procedure. Langenbuch had the temerity to reopen the abdomen. Even when the intraperitoneal method of treating the wound is practised, a gauze tampon as used by many surgeons, including Eiselsberg, Israel, and Keen, ensures the safety of the peritoneum against contamination from bile and against concealed bleeding.

The extraperitoneal method adopted by me in the case reported has been followed according to Tricomi in about 37

per cent. of all hepatectomies. Of course, it is applicable only to cases where a pedicle can be formed. Following the method of Lucke an elastic ligature was used, and this was held in place by skewers. It did not prevent bleeding, because of the cutting of the rubber constricting band. It does not seem to me, however, that the exitus in this case can justly be ascribed to the hemorrhage. As to the safest means of preventing this when the intraperitoneal method is to be followed, operators are still at great variance. The thermocautery has very many advocates, but is considered unsafe by Kocher. Clean excision and careful ligation of the large viens with catgut, as done by Heidenhain, Keen, and others, permits the reduction of the liver wound by approximating its peritoneal margins. The experiments of Kusmetzon and Penzky have shown that the tying of hepatic veins with transfixion sutures is, at least in animals, an easy method of arresting hemorrhage. This method, together with gauze packing for added safety, seems to me an ideal one where applicable. In two cases Kocher used it in pylorectomies on each side of the mass to be removed, crushing through the liver tissue. The mass included between the forceps was removed with a knife without much bleeding. The forceps were left in position forty-eight hours. In one of his cases, however, there occurred a fatal prolapse of the intestine through the wound.

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GASTROENTEROSTOMY.

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Gastroenterostomy at the present day has a definite position in surgery, with a constantly widening of its field of usefulness in the treatment of lesions of the stomach or duodenum.

Twenty-two years ago Wolffler performed the first operation upon a patient where pylorectomy was impossible, and in 1900 Mayo Robson tabulated 1978 cases reported. At the present time gastroenterostomy is performed many times as a routine procedure in certain gastric diseases without much more comment than a cholecystostomy for a diseased gall-bladder.

During these twenty years, however, while the indications for the operation have become more definite, the method of operating and the technique of operation have been the subject of spirited debate. To overcome the confliction of the direction of peristalsis was the first important step, and many modifications in the original operation were made.

Gastroenterostomy was performed at first for the relief of the starvation in obstructive carcinoma of the pylorus, and then, as has happened so often in surgery, a palliative measure was broadened in scope until it became a valuable method of treatment. The one great indication for gastroenterostomy is found in all lesions of the stomach where the contents of the latter are not evacuated. Whether this is due to a malignant or benign obstruction, an inflamed or ulcerated pylorus, or atony of the gastric muscle, the

retained stomach contents must be provided for by an anastomotic opening.

When carcinoma of the pylorus has progressed so far that its removal is impossible, the last months of the patient may be made more restful by the cessation of vomiting and the ability to assimilate food. In obstruction of benign origin usually consequent upon the healing of an ulcerated area of the pyloric mucous membrane, pyloroplasty is sometimes combined with gastroenterostomy, especially in those cases where a gastric pouch has formed, with loss of the muscle power of the stomach. Where the latter complications do not exist gastroenterostomy is not required, and if performed, soon loses its intended purposes and merely aids in the formation of adhesions.

Bleeding from acute or chronic ulceration of the wall of the stomach frequently offers a positive indication for gastroenterostomy, in order to place the mucous membrane in the region of the pylorus, the most frequent site of ulceration, in a state of partial rest, at least. In acute ulcers the excision of the bleeding-point would seem to be the ideal operation, but the consensus of opinion of those of large experience in this work favors a simple gastroenterostomy.

A gastroenterostomy with correct technique will keep the stomach empty, and with the aid of careful feeding sufficient rest can be obtained to enable the ulcerated area to heal.

When a considerable area of mucous membrane surrounding an ulcer is the seat of marked inflammation, or in large erosions or in multiple ulcer direct treatment cannot be done, gastroenterostomy offers by far the best method of procedure. A chronic ulcer, especially in the neighborhood of the pylorus, requires the exercise of great discrimination as to whether a pylorectomy is necessary.

The literature of instances where malignant disease has developed upon the site of a chronic ulcer is increasing rapidly, and such a termination must always be considered and its likelihood and indication for the excision of the

pylorus. Gastroenterostomy is too often considered a last resort for a carcinoma of the pylorus causing obstruction, whereas the lesion should have had surgical interference at a time when a cure was possible. But, on the other hand, it must be admitted that in many cases believed at the time of operation to be malignant by reason of enlarged inflammatory lymph nodes, induration about the ulcer, etc., gastroenterostomy has cured the condition and disproved its malignancy.

The various contractions consequent upon chronic gastric or duodenal ulceration may obstruct the stomach and require gastroenterostomy. In hour-glass stomach it is preferable to divide the wall of the organ in the long axis and close in the opposite direction, but when this is deemed inadvisable gastroenterostomy may be performed. In those cases of hour-glass stomach when the constriction is near the middle, and two large pouches are formed, a gastrogastrostomy at the most dependent portion of the pouches gives better results than gastroenterostomy.

In cases of extensive dilatation of the stomach with loss of motor power consequent upon a strictured duodenum, the result of ulcer, the anastomotic opening is required. The stomach lessens in size to an extent which will depend entirely upon the contractile power of the muscular coat. When the condition of dilatation has lasted for a long time and has appeared gradually, it is questionable whether there will be any actual lessening in the size of the stomach after operation ; but if dilatation has come on very rapidly it will be readily seen that the muscular tone has not been overtaxed, and, therefore, the organ should regain its normal size in a comparatively short time. I would lay stress upon the careful examination of cases of dilated stomach. In some instances this condition is caused by kinking of the pylorus from the downward displacement of the organ due to peritoneal relaxation.

In gastroptosis with dilatation of the stomach better results are obtained, in my opinion, by a gastroplication

and a gastroenterostomy than by the other methods sometimes used.

In some cases of fistulæ between the biliary tract and the stomach where the extent and density of the adhesions may prevent the separation of such adhesions and the repair of the fistula with safety, gastroenterostomy gives good results. Even where gastrolysis can be performed and the fistula closed, the rest and drainage which gastroenterostomy affords gives additional security to the perfect healing of the stomach. In addition, adhesions are likely to re-form, and in such an event the artificial opening prevents the dilatation and other symptoms incident to pyloric narrowing.

In those intractable cases of chronic gastritis where multiple erosions of the stomach are present at the pyloric region, with the mucosa in the neighborhood of the erosion deeply hemorrhagic, and with the occasional "occurrence of profuse or even fatal hemorrhage" (Osler), gastroenterostomy, by placing the pylorus at rest, may cure the condition.

A secretory neurosis of the stomach, with hypersecretion of hydrochloric acid, known in Germany and France as "Reichman's disease," is frequently rebellious to internal medication. In this disease, while the irritation of the highly acid gastric juice induces pyloric spasm at first, yet in most instances atony and dilatation of the stomach occur, and the pylorus becomes eroded and fissured. In these cases gastroenterostomy places the organ at rest and prevents the accumulation of the intensely acid gastric juice with its severe symptoms.

Mayo Robson suggests that, in acute dilatation of the stomach, after lavage has failed, the abdomen should be opened, the stomach emptied and connected with the jejunum, and Weir advises the same operation in tetany, which is often associated with a dilated stomach and may be caused by it.

The methods most often used at the present time for performing gastroenterostomy are: (1) the anterior opera-

tion ; (2) the posterior operation, through the transverse mesocolon ; (3) opening the gastrocolic omentum above the colon and anastomosing the jejunum to the posterior wall of the stomach ; (4) the Roux Y-operation, a modification of Wolffler's second method ; (5) Kocher's operation.

The anterior operation is now usually performed by bringing the jejunum, not the duodenum, up over the great omentum and transverse colon and suturing to the stomach near its dependent portion. While in the hands of some good results are obtained, yet I believe that it entails greater risk from adhesions and intestinal obstruction than is the case in the posterior operation. Another objection is that the site of anastomoses is made too far above the greater curvature and not at the most dependent portion of the stomach, so essential where the stomach no longer possesses much muscular power. If care is taken, however, the anterior opening can be made nearly as low as the posterior, and, at any rate, it is usually believed that the traction of the small bowel brings the anastomosis to the lowest level finally. After performing the gastro-enterostomy the proximal and distal ends of the loop of the small bowel should be stitched to the stomach, the former at a point higher and the latter at a point lower than the anastomatic opening, preventing, to a great extent, any tendency toward spur formation.

The posterior operation is performed by making an incision in the transverse mesocolon, vertical in direction, to avoid interference with the blood supply of the colon, through which the posterior wall of the stomach is delivered and to which the jejunum is to be attached. The jejunum can always be readily found by passing the hand behind the coils of bowel to the left side of the second lumbar vertebra, where the duodenojejunal junction is grasped. I make it the rule to allow free play of the jejunum by leaving sixteen to eighteen inches of bowel between the anastomosis and the junction with the duodenum. This is done for several reasons : it prevents any kinking of

the ligament of Treit, tends to prevent spur formation, and, most important of all, if any subsequent procedures are to be employed, such as enteroenterostomy or Roux's operation, sufficient bowel is left for such operations.

In incising the stomach, as well as the intestine, the incision should first be carried down to the mucous coat, which will then protrude, when, with a pair of tissue forceps, it is grasped and separated at the margin of the wound for some distance from the submucous coat (Robson and Moynihan). The mucous membrane is then cut away to the extent of the length of the wound and about one-half to three-quarters of an inch in width. This prevents the mucous membrane from pouting into the anastomotic opening and lessening its size, which might interfere during the repair of the wound with the emptying of the stomach, unless the opening is made liberally large. To prevent the slipping of a knuckle of bowel between the margin of the opening made in the transverse mesocolon and the wall of the stomach and consequent intestinal obstruction, as well as to prevent the circular compression of the afferent and efferent loops of the jejunum close to the anastomosis, the margins of the opening made in the transverse mesocolon should be stitched to the stomach wall at one or more points and about one inch away from the anastomotic opening.

The supracolic method merely consists of opening the gastrocolic omentum by a vertical incision, bringing up the jejunum over the omentum and transverse colon and suturing to the posterior wall of the stomach. It has no advantages over the anterior operation and is exposed to the same risk of adhesion formation.

Roux advocates an operation which seems to offer many advantages. The jejunum is divided, 20 cm. to 40 cm. (eight to sixteen inches) below the point where it passed beneath the transverse colon and the distal end implanted into the stomach, the proximal end being sutured into an opening made in the descending limb, which has been sutured to the stomach and about four inches below the

latter. It can readily be seen that the "vicious circle" cannot occur, as the bile and pancreatic secretion by the force of gravity will not return to the stomach, unless there is regurgitation of the intestinal contents. The objection that has been raised to this operation is the small opening afforded from the stomach by the rather narrow diameter of the jejunum. Such opening is not smaller, however, than that obtained by the use of the Murphy button or the Mayo Robson bobbin, and not any less than the normal pyloric orifice. I have performed the operation without any disagreeable sequelæ at all, but as I have had like results from the same number of anterior and posterior anastomosis, I have not been able to draw any deductions regarding its greater value than the other operations. Roux's method requires some judgment in its use, and, unless performed with great care, subjects the patient to more risk than the simple posterior operation. Roux indicates its use in benign stenosis, gastroptosis, and gastrectasis. As will be seen later, the operation is of great value when the vicious circle has already occurred.

Kocher endeavors to avoid the return of intestinal contents into the stomach and their resulting decomposition and absorption by bringing the jejunum vertically upward, incising it at right angles to its long axis and suturing to the stomach, so "that the proximal portion of the loop passes vertically upward and the distal portion vertically downward, the former opposite to the stomach. A flap is also formed from the intestine to prevent regurgitation into the stomach." I do not believe, however, that the valve persists for any length of time, nor does the operation prevent the overfilling of the duodenum any better than the posterior operation.

In all of these operations various mechanical devices are used to perfect the anastomosis, of which the Murphy button is, doubtless, the most popular. Personally, I use simply a needle and thread, though in certain cases I have used both the Murphy button and the Mayo Robson bone

bobbin. The great advantage of the needle-and-thread operation is that the materials are always at hand, the opening can be made of any length, thus lessening the tendency to subsequent contraction, which may close the opening. The objections to the mechanical devices are the rather small opening allowed and the subsequent contraction of the opening, particularly when the Murphy button or Senn's plates have been used. If too large a button or bobbin has been used, pressure necrosis of the bowel and perforative peritonitis may result.

Of the various other methods of performing the anastomosis, I have had no experience. I do not use the elastic ligature, because I see no advantages to be derived from its use, and it has the objection that we can never be absolutely sure that the ligature will cut through and establish the opening. The Connell suture has also been recommended, but I have never used it, nor do I use the clamps for the stomach and intestine. By the proper disposition of gauze the portion of bowel to be anastomosed, brought out of the abdomen, can be so compressed against the margin of the abdominal wound that no escape of contents occurs when it is opened. There is no danger of bleeding if the coats are well sutured, and if such is feared, Down's instrument could be used in making the openings. Personally, I do not use the cautery knife, believing it to be cumbersome and tending to a needless multiplicity of instruments.

The prevention of vomiting after operation from the formation of the vicious circle has occasioned much thought upon the part of many surgeons. Some deny that they have ever had to deal with this distressing complication, and it is fortunate that this vomiting is not frequently met with ; yet that it does occur, even with perfect technique, cannot be disputed. The term vomiting from the vicious circle is applied to that condition where the gastric contents pass into the proximal or afferent limb of the loop, become mixed with the bile and pancreatic secretion and are returned to the stomach. Reflux vomiting (Fowler) is due

to the passage of the secretions alone into the stomach, through the new opening, or backward through the partially permeable pylorus. The cause of such severe vomiting has not been determined, some observers having shown that the secretions of the liver and of the pancreas can be led directly into the stomach without impairing digestion or causing vomiting. Fowler[1] believes that the symptoms arising from the vicious circle are due either to "the passage of food into the duodenum and its more or less prompt reflux into the stomach, followed by its injection by vomiting, or from distention of the duodenum and a relative stagnation of the stomach contents from motor insufficiency." To correct these conditions after performing the usual posterior anastomosis, Fowler performs entero-enterostomy between the afferent and efferent portions of the loop of jejunum, and, finally, passes a No. 20 silver wire two or three times around the afferent loop between the two points of anastomosis and drawing upon the turns tightly enough to occlude the lumen of the intestine without strangulating its wall. This absolutely prevents the duodenal end of the loop from communicating directly with the stomach.

The question as to whether the enteroanastomosis should be performed in every case must be answered in the negative. I formerly used such a procedure, but at the present time believe that the simple posterior gastrojejunostomy is more rapid, safer, and perfectly efficacious in the great majority of cases, reserving subsequent operative procedures in the event of the establishment of severe vomiting.

The following case illustrates the few points that I particularly wish to emphasize :

Miss M. J., aged twenty-four years, was admitted to the German Hospital on July 7, 1903. Her family and previous personal history presented nothing of interest, nor did her occupation, that of tobacco stripper, have any influence on her condition.

[1] Annals of Surgery, November, 1902.

Three years before the first symptoms of gastric trouble appeared with a gradual failing of the appetite, eructations of gas and fulness and distress after taking food. A year later she began to vomit after eating. The vomited material was quite sour, the sourness increasing when the food was retained for a while before the vomiting. There was never any hæmatemesis. The gastric distress increased and was soon accompanied by a burning pain in the epigastrium, just above the umbilicus, and referred along the costal margins of both sides. This pain was not relieved by eating or drinking. The bowels, which had been regular during the earlier months, became constipated. There was never any diarrhœa.

Her treatment had consisted, after a course of the various stomachics, of lavage practised every alternate day since December, 1902. When the stomach washing was practised in the morning remains of food eaten the night before were found, together with much mucus.

Upon admission nothing of moment was observed by a physical examination. There was tenderness of the abdomen 1 cm. above the umbilicus and over an area 3 cm. in diameter, and also a tender point over the twelfth rib, posteriorly. The stomach capacity was 1500 c.c., the lower border reaching to 1 cm. above the umbilicus when distended.

Operation, July 8, 1903, under ether anæsthesia. An incision five inches long was made through the right rectus, the peritoneum was opened and the stomach appeared immediately below the wound. Numerous adhesions, fibrinous in character, were found around the neck of the gall-bladder and duodenum. The gall-bladder was normal and slightly distended. The stomach was then carefully examined and observed to be slightly enlarged, rather low in position, and the pyloric opening somewhat thickened, otherwise negative.

The intestines were walled off with gauze pads, the transverse colon and mesocolon delivered out of the wound and

protected with gauze. The transverse mesocolon was incised and the posterior surface of the stomach exposed and brought out of the wound ; a loop of the upper portion of the jejunum was delivered and brought up to the posterior wall of the stomach, to which it was stitched by a continuous Lembert suture, introduced for a distance of about two and a half inches. An incision was then made into the jejunum, about two inches in length, through the serous and muscular coats, and the protruding mucous membrane excised. A similar procedure was performed upon the stomach. The free edges of the stomach and jejunal wounds were united with through-and-through silk suture. The Lembert suture was then continued anteriorly, completing the peritoneal apposition. The abdomen was closed with tier suture.

The patient reacted well from the operation, was free from vomiting until July 13th, when 700 c.c. of dark-green bile was vomited. General condition good.

July 15th. Patient vomited bile during the night. Appetite good ; feels better than she has in years. Stitches removed. Incision healed by first intention.

17th. Patient vomited bile, with small portion of fecal matter.

18th. During the early morning the patient vomited ; vomitus stercoraceous in character, about 300 c.c., and an intestinal obstruction was believed to have taken place, necessitating a second operation.

When the abdomen was opened the omentum was found adherent to the old scar. These were separated, and the omentum and transverse colon turned upward. This reflection upward carried several coils of small bowel along, and it was found that the proximal and distal limbs of the anastomosed loop were firmly adherent to the posterior layer of the transverse mesocolon, interfering to a marked degree with the peristalsis of the bowel. The adhesions were all separated and such bowel surfaces as were denuded by the separation were sutured with silk or covered with

cargile. The gastroenterostomy was apparently perfect. An enteroenterostomy was then performed, 15 cm. (six inches) below the anastomotic opening, in the usual manner. The abdomen was closed by tier sutures. There was some vomiting of a green material upon the two days following operation, which stopped upon the use of lavage.

25*th*. Stitches removed ; wound healed by first intention.

26*th*. Patient vomited twice about 300 c.c. of light-greenish material. Wine of ipecac, 10 drops every hour, was given.

27*th*. No vomiting.

31*st*. Ipecac stopped.

August 2*d*. Vomited 300 c.c. of light-green material about 10 P.M. Vomiting cannot be attributed to anything eaten. Placed upon ipecac wine 10 drops every two hours during the day.

7*th*. Vomited small quantity of yellow material. Ipecac stopped.

12*th*. Discharged ; condition fine. Is gaining weight, and has not vomited since August 7th.

On September 14, 1903, this patient was readmitted to the German Hospital. She stated that on August 16th, four days after her discharge, vomiting had recommenced, at first of bile and later of food and bile. When admitted she vomited everything given by the mouth, and large quantities of thick, ropy, dark-green material, with a very strong odor. Feeding by rectum was begun, but notwithstanding this the patient continued to vomit the thick, dark-green material, containing large quantities of bile. On washing out the stomach large quantities of the same material were obtained. It was evident that the biliary and pancreatic secretion were regurgitating into the stomach and causing vomiting.

Her nourishment was good, notwithstanding the vomiting, proving that the food must be digested in great part, especially as the patient does not seem to have lost much weight. Eyes examined by Dr. W. T. Shoemaker, with

no abnormal findings. By a rectal examination the pelvic organs were apparently normal; there were no symptoms or signs of locomotor ataxia.

Operation was performed on September 19th. When the peritoneum was opened the omentum was found universally adherent and there were dense adhesions between the coils of bowel. The gastroenterostomy was exposed and the opening found to be freely open. The entero-enterostomy was exposed, some difficulty being encountered in distinguishing the parts of the anastomosis by reason of the numerous adhesions. When these were separated the anastomosis was found to be in perfect condition, with some sacculation. Adhesions were further separated throughout the abdominal cavity. The entire omentum was ligated and cut away. The gall-badder was found normal in size, numerous adhesions found around it; stomach normal in size. By means of a pedicle needle a piece of silver wire was passed around the pylorus and tied. Parts were then returned. Abdominal cavity filled with normal salt solution and the abdomen closed by tier suture. The patient was shocked, the pulse barely perceptible at the close of operation. An intravenous injection of salt solution was given before leaving the operating-room.

September 20*th*. Patient had vomited bile several times during the day.

22*d*. Buttermilk ordered. Patient feels somewhat distressed in the epigastric region. No vomiting.

23*d*. Patient feels well; no epigastric distress.

29*th*. Ate light diet. No nausea or distress.

October 10*th*. Patient vomited after breakfast.

11*th* to 15*th*. Vomited several times each day; complained of abdominal pain; there was some tympanites. The fourth operation was, therefore, performed, and a coil of small intestine found closely adherent to the parietal peritoneum. The intestines were found universally adherent to each other and to the remains of the omentum, binding

together the transverse, ascending, and descending colon and sigmoid flexure and various loops of small intestine, one to another. No portion of the bowel, excepting about five feet of ileum, was free from adhesions. The adhesions were separated, bleeding-points ligated, and all denuded surface covered with cargile. The enteroenterostomy and gastroenterostomy were examined and found patulous. At no portion were the intestines collapsed or unduly distended. The abdomen was closed by through-and-through sutures of silkworm gut.

17*th.* Much vomiting.

19*th.* No vomiting.

29*th.* Stitches removed; wound healed without inflammation.

November 2*d.* Patient allowed to sit up in a chair; no vomiting; feels strong.

9*th.* Patient walking about.

13*th.* Discharged.

The patient was home for ten days, when she again began to vomit as before, in the morning bile, later in the day particles of food; would vomit two or three times every day.

On readmission the patient's nutrition is good. On abdomen two scars of former operations; slight distention of the stomach.

The fifth operation was performed December 7, 1903. An incision seven inches long was made dissecting out the last cicatrix, peritoneum opened, and many adhesions found between intestines and under-surface of incision. Universal adhesions were present throughout the intestinal canal; these were carefully dissected free and two holes in the intestine, which were accidentally made, were closed by sutures of silk. Abdomen was filled with salt solution and the wound closed by through-and-through sutures of silkworm-gut.

January 19, 1904. Patient apparently entirely well.

This unfortunate woman has, therefore, undergone five operations, one after the other, for the relief of severe vom-

iting. An enteroenterostomy and occlusion of the pylorus have both failed to relieve her condition. The etherization in each operation has been easy of accomplishment. Every cause for vicious circle or for jejunal reflux seems to have been eliminated, except the influence of adhesions, which have been met at each operation. The patient gained in weight, even while vomiting, indicating that the digestive power was unimpaired.

From this case and two former ones requiring reoperation I must believe that the formation of adhesions plays the chief part in favoring severe vomiting, by the inhibition of the normal peristalsis and the retention of the bile and pancreatic secretions in the loop of the afferent limb of the jejunum. This limb must be a loop, as we cannot make a rigid tube from the duodenum to the enteroanastomosis, and in the absence of sufficient muscular tone or the presence of obstructing adhesions the secretions must accumulate. The effect of food, the exciting agent of the flow of these secretions, causing vomiting an hour or so after eating, also would seem to indicate the influence of retained secretions. The sagging of the jejunum from the weight of the secretions dragging upon the efferent loop may also have an influence upon the stomach.

My future procedure will be to perform the posterior method of anastomosis or the Roux Y-operation, and in the event of vomiting following the former method I will reoperate, divide the afferent limb just below the stomach, and implant it, as in the Roux Y, into the efferent limb some 10 or 15 cm. (four or six inches) below the stomach, closing the shallow sac above close to the anastomotic opening.

The after-treatment of a patient upon whom gastroenterostomy has been performed is of the greatest importance. Shock, vomiting, and pneumonia should be guarded against at the time of operating. I use a hot-water bed, hot bottles, and a cotton jacket during the operation, and have the anæsthetic administered with the greatest care. The arms should never be folded across the chest, thereby impeding respiration.

If shock occurs the usual remedies are administered, and, above all, saline solution by the bowel, at first combined with whiskey, and later intravenously, if the condition of the patient should demand it.

Vomiting is greatly to be feared, and while I usually allow liquid food eighteen hours after the operation, the occurrence of nausea is an indication for its discontinuance, substituting rectal feeding. If vomiting does occur, the best treatment is, undoubtedly, gastric lavage, using small quantities of water at a time, 200 to 300 c.c., and giving absolutely nothing by the mouth.

Peritonitis is unavoidable if the anastomosis gives way, but by the careful use of the needle-and-thread method the danger is minimized and far less liable to happen than with the use of mechanical appliances. Upon the onset of peritonitis, a reoperation is imperatively demanded, the anastomosis strengthened, and the peritoneum washed out. If the shock does not prove fatal, such a patient should usually recover, as the infection from the fasting stomach is not of a very virulent type.

VAGINAL CYSTOTOMY FOR STONE IN THE BLADDER.

By Charles R. Robins, M.D.,
Richmond, Va.

Stone in the bladder is of infrequent occurrence in women. Owing to the short and easily dilated urethra the stone is passed while it is still small, and operative measures are not required. It is probable that stones originating in the kidney are in most cases passed at once through the urethra as soon as they reach the bladder, and where large stones are found they are due to some pathological condition in the bladder itself. The literature on this subject which I have been able to consult is meagre and unsatisfactory, especially as regards the indication for any special operative treatment.

I find that the following methods of treatment are advised: Dilatation of the urethra and extraction of stone by this channel if its size will permit; the operation of lithotrity, suprapubic cystotomy, and vaginal cystotomy. My observations are based on two cases, as follows:

Case I.—Mrs. E. C. B., admitted to the Old Dominion Hospital, February 11, 1903, with the following history:

The patient was aged sixty-eight years, white, married. Had been suffering for a number of months with the bladder. At present the desire to urinate comes on every few minutes, day and night, accompanied with paroxysms of violent pain and straining. Is unable to control urine, and the act is followed by marked tenesmus, is weak from pain and loss of sleep.

Examination of the Urine. Pale, turbid, alkaline; specific gravity, 1010; marked sediment; good trace of albumin; some squamous epithelia; considerable quantity of pus; large quantity of amorphous and triple phosphates.

Physical Examination. Patient suffering from reducible inguinal hernia. With this exception is in normal condition for a person of her age. Sound introduced through urethra at once encountered a large, soft stone. Examination with the cystoscope revealed the stone, but tenesmus was so great I could get no view of the bladder wall. Bladder seemed to be contracted to size of stone, which was held tightly against the orifice of the urethra. Urine voided every few minutes with violent pain.

Operation was performed on the next day under general anæsthesia. A pair of curved dressing forceps were introduced through the urethra with the point downward until the point could be felt by the finger in the vagina. The blades were then separated, and an incision made in the median line, between the blades of the forceps, just beyond the internal urinary meatus, sufficiently large to introduce the finger for exploration. The bladder was found greatly contracted and containing a large stone about the size of a pullet's egg and filled with débris consisting of phosphatic deposit held together by mucus. The incision was enlarged with scissors, and the contents removed with the finger and scoop. The wound was left open for drainage without sewing the mucous membranes of the bladder and vagina together, and the patient put back to bed. She bore the operation well, and had the most comfortable night she had had for a long time. Cleansing vaginal douches was ordered at frequent intervals, and on the third day daily irrigations of the bladder with warm boric solution were commenced, together with the internal administration of benzoic acid solution. The irrigations were practised in the following manner: The perineum was retracted, and a pair of curved dressing forceps introduced through the artificial opening, and the blades separated. A catheter

was introduced through the urethra and connected with the irrigator, and the bladder flushed out until it was perfectly cleansed. At first there was a marked tendency to the formation of a phosphatic deposit, but as the urine became more nearly normal this disappeared. About a week after the operation I found that, although the urine would drain through the vagina immediately after the fistula was opened at the irrigation, by the next morning there would be very little if any urine escaping in this way, and the patient would void by the natural channel.

This plan of treatment was continued for three weeks, at the end of which time I discontinued opening up the fistula, the urine showing a marked improvement, although a slight quantity of pus and amorphous phosphates was still present. The bladder was irrigated for two weeks longer, and the patient then discharged. At that time she was complaining of very little discomfort in her bladder, and was able to retain her urine for a number of hours, having to void only once or twice during the night. The contraction of the bladder had subsided to a marked extent, and only a slight quantity of pus was present in the urine.

CASE II.—Mrs. B. W. R. was admitted to the Old Dominion Hospital March 28, 1903, and gave the following history:

The patient was aged thirty-four years, white, married. Had been suffering with her bladder for sixteen months. At first she suffered pain only when voiding, when she would have severe burning. Later, pain became more and more severe and would last a considerable time after urinating. Exercise aggravated her symptoms to such an extent that she was unable to attend to her household duties, and was reduced to a condition of invalidism.

Physical Examination. Subinvolution and retrodisplacement of uterus and chronic inflammation of both tubes. There was no vulvitis or urethritis. Introduction of sound through urethra encountered a well-formed stone about the size of a pigeon's egg.

Examination of the Urine. Squamous epithelia, large quantity of pus, and some red blood cells.

On April 4th the operation of vaginal cystotomy was performed in the same manner as previously described. There was some bleeding from the incision, which was controlled by two stitches of catgut. The same after-treatment was instituted as in the former case, except that, as there was no phosphatic deposit, salol and urotropin were administered by mouth instead of the benzoic acid solution. All symptoms improved greatly, but there was a persistence of a large amount of blood in the urine. Finally, sixteen days after the operation, I made a cystoscopic examination of the bladder to discover its source, and found a polypus projecting from the base of the bladder. I endeavored to remove this with a snare, but only partially succeeded after several attempts, and finally, on April 27th, I enlarged the vaginal incision, and succeeded in completely removing it with my finger and a curette introduced through the urethra. The irrigation treatment was continued for two weeks longer, when I discontinued opening the fistula with forceps, which closed in a few days, and the patient was discharged on May 22d, feeling very comfortable and with her urine near normal and free from blood. There was some weakness of the bladder, due to the repeated severe dilatations of the urethra, which I had practised in my efforts to remove the polypus.

My experience with the two cases reported has led me to conclude that vaginal cystotomy is the operation of choice in the majority of cases where stone is found in the female bladder.

Compared with other methods, lithotrity is often difficult of application. In the first case reported, where the cavity was practically filled with the stone and débris, and where no fluid could be retained, it would have been practically impossible. In most cases we would have difficulty in retaining sufficient fluid to enable us to work the lithotrite with safety, as the urethra permits its passage during the

manipulation of the instrument. There is no provision for drainage, which is imperative in cases of accompanying aggravated cystitis.

Extraction through the urethra is applicable only in cases where the stone is quite small. Dilatation of the urethra when carried beyond a certain point is liable to rupture the sphincter muscle and establish permanent incontinence.

Suprapubic cystotomy makes a prolonged and disagreeable convalescence, and does not drain at the most dependent point or permit of so satisfactory irrigation of the bladder.

Vaginal cystotomy is the ideal operation in most cases. It is easily and quickly executed, and if necessary can be done under cocaine anæsthesia. It gives the best drainage if cystitis is present. The formation of a permanent fistula is unnecessary, as by dilating the opening daily when the bladder is irrigated we accomplish the same result. Union of the wound is prompt and occurs without suture. By using a large number of vulvar pads and frequent bathing the patient can be kept in a comfortable condition as long as drainage is necessary. The only objection that can be urged against the operation is the danger of forming a vesicovaginal fistula. I believe that if we refrain from sewing the mucous membrane of the bladder and vagina together, and rely instead on a daily opening of the incision, that we will seldom encounter this complication. In the second case I had union in four days after the opening had been dilated for five weeks. If a fistula does occur, its repair should be easy, as we have a linear incison to deal with and no destruction of tissue.

SURGERY WITHOUT LIGATURES.

By Andrew J. Downes, M.D.,
Philadelphia, Pa.

To-day it can be unequivocally stated that as a rule, in a modern operating room equipped with electric current, routine surgery can be done without the use of ligatures. The exception to this rule would be the little surgery requiring hæmostasis of vessels above the size of the axillary or femoral. The bloodvessels would be controlled by the application of pressure and heat. The source of the heat would be electricity. Electrothermic hæmostasis, electrothermic angiotripsy are the names describing the method.

I have already written a number of papers on this subject. Articles also have been published by Dr. John W. Keefe, of Providence, R. I.; Dr. Charles P. Noble and Dr. Orville Horwitz, of Philadelphia; Dr. J. Wesley Bovée, of Washington, D. C.; Dr. Goldsphon, of Chicago, Ill., and Dr. Zinke, of Cincinnati, Ohio. Dr. Barton Cooke Hirst and Dr. E. E. Montgomery, in their recently published textbooks on gynecology, have referred quite fully to this method. I take it for granted, therefore, that members of a body such as the Southern Surgical and Gynecological Association are not unacquainted with this literature, and that but a brief reference to the technique is necessary in this paper. Electrothermic hæmostasis is the simultaneous action of pressure and heat on the bloodvessels. The pressure is effected by the blades of forceps or angiotribes; the heat by a piece of platinum rendered red or white hot, which transmits its heat to one blade of the instrument. For hæmostasis

en masse or of large vessels the platinum in the shape of a ribbon is concealed within the steel of one blade of the angiotribe or forceps and transmits its heat to the active face of the blade. For small bleeding-points the platinum in the shape of a loop is applied incandescent to the tip of the ordinary artery forceps.

In the use of this method electricity is used only as a physical agent to obtain another physical agent—heat. A very slight knowledge of electricity only is required. As we can have electric light by the turning of a button, so can we have heat in the active blade of these instruments by simply connecting the proper current. Surgeons have a way in discussion of referring to the uncertainty of using electric apparatus. But how often in a building installed with electricity and wired for lighting is the light missing when wanted. In the development of my instruments I finally reached the point that the various angiotribes, the cautery knife, and heater require the same current. A continued improvement on the part of the makers of the transformers and motor transformers for converting the electric-light current to the requirements of these instruments has evolved light, compact, and very practical apparatus. All that is required is to set the rheostat at the proper place for each individual operating-room and turn the current on as required, which can be done by an assistant or nurse, or a foot brake can be in connection with the transformer and operated by the surgeon's foot. Nothing could be simpler, therefore, or more practical.

The outfit for this work consists of three straight angiotribes with blades $\frac{1}{4}$, $\frac{3}{8}$, and $\frac{1}{2}$ inch wide and at least one with curved blades. A shield, a cautery knife, the artery forceps heater, the cable, and the proper transformer complete the outfit.

A fuller description of the various angiotribes and the electric transformers for controlling or converting the electric-light current to the requirements of these instruments will be found in an article which appeared November 28, 1903,

in *American Medicine,* entitled "Abdominal and Pelvic Surgery without Ligatures."

Up to date over thirty American surgeons are equipped with these instruments. Some have had them but a short time; others have as yet not used them often. A few of the users have almost dispensed with ligatures and some have. The variety of operations that have been performed without a ligature by the use of these instruments includes hysterectomy, vaginal and abdominal, for a variety of conditions, including cancer, sarcoma, and tuberculosis; salpingo-oöphorectomy, single, double, and conservative, including a large percentage of pus cases and extrauterine pregnancy; ovariotomy for solid tumors, ovarian and dermoid cysts, appendectomy for catarrhal, chronic, acute, gangrenous, and ruptured cases; cholecystectomy, excision of pylorus, bloodless incision into stomach, gastrectomy (experimental on dogs), intestinal anastomosis (a number of cases), resection of omentum (intra-abdominal), epiplocele; in extra-abdominal surgery, nephrectomy (three times), varicocele (over twenty cases), castration, hemorrhoids (over fifty cases), hernia, breast operations, goitre, and all the various amputations, including the shoulder and thigh. Among a large number of other operations is a bloodless amputation of the corpora cavernosa for cancer of penis. It is becoming difficult to name an operation which has not been performed using this means of hæmostasis.

On December 4, 1903, I wrote to most of the surgeons equipped with these instruments asking the number of operations performed without ligatures, their opinion of the method, and if they had secondary hemorrhage. The time was rather short for some to look up their list of cases. With but a few exceptions all admitted the certainty of hæmostasis. The few exceptions admitted it was lack of experience or timidity that made them occasionally use also ligatures. No surgeon reports a secondary hemorrhage.

As already stated, a number of surgeons did not give the list of cases. Those that did show over 400 major abdomi-

nal operations performed without a ligature and without secondary hemorrhage. Averaging those not definitely reporting the number, at least 600 major abdominal operations can be claimed to have been operated upon and hæmostased by pressure and heat. This number omits extra-abdominal and minor surgery.

Those having the most experience besides myself are Dr. J. W. Keefe, 100 abdominal operations, including 22 hysterectomies. He began the use of the method November 9, 1902. His list includes one nephrectomy and a number of cases of intestinal anastomosis; not a ligature in any of these cases.

Dr. J. Wesley Bovée, at Columbia Hospital, Washington, beginning March 10, 1903, to December 1, 1903, has performed 45 abdominal sections with this method of hæmostasis, including 25 hysterectomies, of which four are vaginal. In his list are all varieties of salpingo-oöphorectomies, appendectomy, dermoid and ovarian cysts. Not a ligature in these cases.

Dr. Carl Vischer, of Philadelphia, beginning the use of these instruments October 3, 1903, has performed over 30 abdominal sections, including 11 hysterectomies. His list includes 1 cholecystectomy, 2 nephrectomies, amputation of shoulder, castration and appendectomy, salpingo-oöphorectomy, etc. He tells me he is certain he can do his work as quickly as he ever did with ligatures. He does not care for catgut and was never satisfied with silk. From one patient, actual operative time, he removed in twenty-two minutes the vermiform appendix and uterus.

Dr. Noble, of Philadelphia; Dr. Goldsphon, of Chicago, and Dr. Zinke, of Cincinnati, have published most of the work.

Dr. Goldsphon, while claiming almost wonderful advantages for this method of hæmostasis in vaginal hysterectomy, finds fault with me for making such strong claims and for advocating its use to the general exclusion of the ligature in abdominal surgery. My answer is that the surgeon who

can do vaginal hysterectomy without ligatures can more easily, if properly equipped with the instruments, do any kind of work within the abdomen.

Dr. Ochsner, of Chicago, writes me as follows: "The time is too short to look up my histories for a correct report concerning the number of cases in which I have used your clamp. I have used it, however, in abdominal and vaginal hysterectomy, in pyosalpinx operations, in excision of gall-bladder, in excision of the pylorus, in varicocele, operations on hemorrhoids, in removal of ovarian cysts, and in appendicitis operations. I have had no secondary hemorrhage. There is no doubt but what the instrument controls hemorrhage in a satisfactory way. In cases in which this can be done equally well with a small catgut ligature, I would prefer the latter because it is less troublesome."

Dr. Ochsner does an immense amount of surgery and it will probably be some time before he finds an equipment of these instruments as practical in the control of general operative hemorrhage as he does now the ligature. Yet I have great confidence that the near future will prove how extremely practical is this method.

Dr. Howard Kelly, of Johns Hopkins, writes me he is too busy to look up the cases on which he has used this method and states: "I have used the instruments repeatedly with entire satisfaction. In no case have I had secondary hemorrhage."

The following is from Dr. Tuholske, of St. Louis: "My experience with the electrothermic hæmostatic instruments is limited as yet, because of my long absence from home, not because of want of confidence in the method. I have been pleased with it in the cases I used it. Ovariotomies, 8; pedicles dropped without ligature, no disturbance; course aseptic; appendectomies, 3, the treated stump invaginated, no ligatures to mesoappendix or stump; varicocele, 3. I am favorably impressed with the method and shall give it further trial."

Dr. Ackermann, of Wheeling, West Virginia, writes me that he has had the instruments less than two months, during

which time he has performed the following operations: re-amputation for painful stump of the upper third of thigh, amputation below the knee (accident case), amputation of forearm for diabetic gangrene, supravaginal hysterectomy for large uterine fibroid, salpingo-oöphorectomy for pus tubes with extensive adhesions in Douglas' cul-de-sac; radical operation for inguinal hernia, the hæmostasis and ablation of sac by these instruments, castration, operation for large goitre, and resection of lower jaw for carcinoma. Not a ligature in any case. The abdominal hysterectomy was very singularly free from pain after the operation, also the amputated patients complained of a minimum of pain.

Dr. Barton Cooke Hirst writes me as follows: "I am sorry that I cannot answer your questions as fully as I should like. I have the equipment for electrothermic hæmostasis in both the University and the Howard Hospitals, and I have used them quite extensively. The cables and clamps are boiled for every abdominal operation, and if in the course of the operation the case seems suitable I use the clamps. I should say, off-hand, that I used them about fifty times or more. The operations include two extrauterine pregnancies, hysterectomy for both cancer and sarcoma, and every variety of salpingo-oöphorectomy. I have not had a case of secondary hemorrhage, but in both my cases of extrauterine pregnancy the arteries spurted when the clamps were removed, and I put a catgut ligature around both vessels under the ribbon of cooked tissue." In regard to the spurting of the arteries in these two cases on removal of clamp, it is possible that either too little pressure was applied or too short an application of heat was given. It has occasionally in the past, but not for over a year, happened thus with me. In such cases the reapplication of the clamp with narrow blades for a few seconds is quicker and better than the use of ligatures. The spurting of blood from a white cooked area is easy to manage.

Dr. Farison, of Jersey City, writes me he has used this method in panhysterectomy for cancer, in salpingo-oöpho-

rectomy, and in appendectomy with very happy results. He states: "My results in cancer have been so discouraging that I had almost abandoned hysterectomy."

Dr. H. G. Wetherill, of Denver, Col., has performed the following operations: abdominal hysterectomy, 2; vaginal hysterectomy, 3; salpingo-oöphorectomy, 2; appendectomy, 6; ovariotomy for very large cyst, 1; hemorrhoids, 2; recovery smooth and noticably free from pain. He states in his letter: "Though I have had instruments many months, have used them only very recently. I like them and shall use them more extensively in the future. I feel perfectly secure from secondary hemorrhage in using them on large vessels. The diminished after-pain has been a noticeable feature with me."

Dr. D. J. Brown, of Springfield, Mass., who has had the instruments but a very short time, writes me he has operated on hemorrhoids and on two pelvic pus cases with excellent results, except in the hemorrhoidal case, in which the heat penetrated the shield, he says, and burned the skin beneath. In over 50 hemorrhoidal operations, of which I have done 26, this is the first time to my knowledge that such an accident has happened. One should not clamp beyond the mucocutaneous margin into the skin, and we should remember that the heat travels about one-sixteenth of an inch beyond the tissue within the grasp of the blades. It is good practice in hemorrhoidal operations to make traction away from the base of the pile and to have the shield lightly clamped around the blades of the angiotribe.

Dr. Robertson, of Warren, Pa., reports one hysterectomy. I quote the following from his letter: "Not long ago I was talking with Roswell Park about your clamp, and he had an idea that the clamped tissue was charred and did not favor leaving that in the abdomen." I have already corrected this impression in other articles. There is no burned tissue left unless one does defective work. The tissues under pressure are cooked a brief time at a temperature just above 212° F. until all the albuminous constituents are coagulated.

White, sterile, coagulated ribbons of tissue are left. No carbonized tissue.

Dr. E. E. Montgomery and Dr. J. W. Fisher, of Philadelphia, have each used the method in hysterectomy for cancer, in hemorrhoids, and in appendicitis.

Dr. John B. Deaver has used it in cancer of breast and appendectomy.

A number of busy surgeons equipped with the instruments wrote me they have as yet not gone into the method sufficiently to report their work, but in the little they did no hemorrhage occurred. A few surgeons have not answered. I do not know the names or addresses of some of the surgeons the instrument house has supplied.

As stated in the beginning of this paper, I know of over 400 abdominal sections in which this hæmostasis exclusively was used. I am almost certain of 200 more.

From reported work I can claim 125 hysterectomies, of which 30 were for cancer, 1 for sarcoma, 1 for tuberculosis, over 250 salpingo-oöphorectomies for all the various conditions, including 20 extrauterine pregnancies and a large percentage of pus cases, both through the abdominal incision and per vaginam. I recently removed a very large pus sac per vaginam by bisecting the uterus and clamping off with these instruments the sac after removal of the uterus. I have many a time seen the vagina left full of steel clamps after a much less difficult case. In over two years I have not had a pelvic suppurative case die

The appendix has been removed not less than 300 times for the various conditions, including the most difficult suppurative and gangrenous cases. Many of these cases were multiple operation cases. Not less than 40 ovarian cysts have been thus removed.

Three kidneys, all pyonephrotic, speak well for the method. In castration and varicocele the operators report an almost complete postoperative freedom from pain. My own work includes very close to 150 abdominal sections without a ligature, including 34 hysterectomies, over 100

salpingo-oöphorectomies; over 100 appendectomies; 15 ovarian cysts, and a variety of other operations, including 26 hemorrhoidal cases.

Not an individual reports a secondary hemorrhage. There seems to be a unanimous opinion that there is less postoperative pain than after the use of ligatures. There is sure to be none of the distressing sequelæ that followed the use of silk and even yet to some extent catgut. As to mortality rate, it would make the paper too long to enter into it. I am thoroughly convinced it is less in the cases operated upon by this method than would be a similar number of operations by the various other methods of controlling hemorrhage. For example, in the 30 hysterectomies for cancer by this method only one death occurred within a week after the operation.

The special claims of this method in the treatment of uterine cancer are admitted by most surgeons. It has equally strong claims in the handling of pelvic pus cases. It is admitted by a number of surgeons that ligatures in a septic field are bad. For this reason so many surgeons adopt the vaginal route and leave in a number of steel clamps. Wherever a steel clamp can be left for hæmostasis, immediate hæmostasis can be effected by this method. In abdominal operation for very difficult pus cases with extensive adhesions, and where hæmostasis, low in pelvis, is to be effected, I claim that the ligature is far less practical than the use of these instruments in the hands of those who have developed the proper technique. If I am able to claim advantages for the method in difficult pelvic cases, why is it not the thing to use in less difficult? If vessels the size of the axillary, femoral, and renal can be certainly and rapidly hæmostased by pressure and heat, why should a ligature be even used in the abdomen in a modern operating-room? In the beginning of this paper I tried to call attention to the great practicability of the method. Instruments and cable that can be boiled. Small, compact current controllers, the current as required switched in by the surgeon's foot. No turning

of rheostat or counting time. A little practical knowledge easily obtained and hæmostasis is robbed of possible subsequent trouble.

If surgeons would remember their tribulations in the use and selection of various ligature materials, fine and coarse silk, braided and twisted, celluloid and linen thread, catgut, and the various methods of preparation, they might gradually look into this method and find it as practical as some of the men who are now able to dispense with ligatures wherever they can obtain the electric current. The almost universal expression of opinion of those using the method, that there is less postoperative pain, is one of the many valuable claims in abdominal surgery.

In conclusion I desire to state that I have not attempted to enter deeply into this subject of "Surgery without Ligatures." I simply wish to keep before the members of the surgical profession the fact that a method of hæmostasis without ligatures is on trial and facing criticism, that in over 400 major operations no hemorrhage is reported, and that with proper technique hemorrhage need never be met with. Was there ever in the history of surgery 400 operations done without ligatures and without hemorrhage?

THE SURGICAL PHYSIOLOGY OF THE LYMPHATIC SYSTEM.

By C. H. Mayo, M.D.,
Rochester, Minn.

A study of the lymphatic system readily explains many physiological as well as pathological processes. The great part played by the absorbents in maintaining the nutrition, repair, and defence of the system has apparently received but little attention as compared with its importance. That the greater part of the absorption of the body, excepting the intestinal, is accomplished by the lymphatics, is well understood, but their direct relation to surgery seems to have been but occasionally appreciated.

The lymph system, consisting of vessels, channels, spaces and glands, accompanies the arterial system, but varies greatly in extent and character, according to location. These vessels drain certain definite areas, and when diseased by infection it is usually possible to locate the point of its entrance. The lymphatic is a closed system, having capillaries ending in connective-tissue spaces, and the vessel walls, while resembling veins, are exceedingly thin. When we consider that all the tissues of the body are more or less bathed with lymph, a fluid derived from and almost similar to the blood plasma, we would expect to find, as is the case, that tissues will be supplied with lymph and absorbents in direct proportion to their exposure and necessity for repair, as well as to their activity. Interspersed in the course of the lymph vessels are found groups of glands. These organs vary from the size of a pinhead to that of a large bean, and serve from their structure to

act as filters to all the fluid passed through them. The glands are filled with nests of the forming leukocytes, and all the lymph is exposed to the probable purifying action of these cells. Here it is that the great bulk of bacteria is checked in infection, and through the action of the leukocytes or some unknown physiological chemistry only a limited number of bacteria and the toxins are permitted to pass to the venous system. It is here that the cancer cell is checked and later overpowers the gland and develops in its outer layers; so one gland after another takes up the work of protection by preventing the waste cells, the products of metabolism, of nutrition, repair or infection, from entering the blood unchanged. Leukocytosis then, to a great extent, will depend largely upon the region involved in inflammation as well as the intervening gland and lymph area between it and the circulation.

An enlarged gland is then an evidence of a local struggle or of a defeat, and it is this type of gland tumor usually considered in surgery. The great number of battles won are an unknown condition, therefore, the less appreciation of their work. Manfrid, in an examination of eighty-eight animals and three men who had died of non-infectious diseases, found infected glands in seventy-eight of the animals and all of the men. The glands are grouped in the neck in large numbers, as about the mouth, nose, and trachea are so many points possible for the invasion of bacteria. Other glandular aggregations are placed on the flexor and vessel side of the union of the extremities with the body, while the interior of the thorax and abdomen are freely supplied with such organs of chemistry and defence. It is claimed that the glands are capable of re-formation after removal, by development at the union of new lymphatic vessels, as the cells found and the reticulated structure and capsule are all capable of generation in these glandular regions. For this reason we must, if possible, destroy the original focus when glands are removed for infection. In certain cases where the glands and lymphatic area are so

thoroughly removed that the return of the lymph to the circulation is nearly abolished, a peculiar condition of lymph œdema of the limb develops and remains until the equilibrium of the circulation is re-established. This is noticed not infrequently in cases of complete operation for cancer of the breast, where the arm may remain in such a condition for a considerable period. For a long time it was thought that there were but the two lymph ducts of entrance into the circulation. The right lymphatic duct opening into the right subclavian vein receives absorbents from the upper right half of the chest and thorax, also the right upper extremity and side of the neck and head. The left or thoracic duct empties into the commencement of the left innominate vein and drains, or has been supposed to drain, all the rest of the body. Leaf has recently found that there may be a communication between the lymphatics and small veins in the groin, and it is possible that others exist and will eventually be located. The nutrition of the body is maintained by absorption of water and digested food, nearly all of which is taken directly into the circulation of the intestine, after passing the epithelial cell. By some wonderful chemistry this cell prepares this material into a suitable condition for association with the blood. The fats are unable to pass the barrier, and, with the products of metabolism, in maintaining the chemistry of the absorbing cells enter the circulation by way of the chyle-ducts.

It is now generally considered that the ductless glands are drained by the lymphatics. When we think of the great importance and the intense and sudden effects of these glands when given to the system we can see the benefits of an intricate duct system, while the failure to drain certain alveoli may partially explain the development of peculiar types of retention cysts, as in colloid cystic goitre. The hard, dry gland often found in exophthalmic goitre and the extreme symptoms of Graves' disease, many of which may be produced by thyroid feeding, may possibly be in part from an excess of drainage.

The lymph fluid being of nearly the same density as the blood, there cannot be expected to be any great osmotic action into the circulation, although the ready absorption of solutions injected into the tissues is explained by direct endosmosis as well as by lymphatic absorption. The quantity of lymph depends upon the pressure in the capillaries and the permeability of their walls, while its circulation depends upon muscular action, the respiration, and the heart.

The causes of inflammation are from thermal, mechanical or toxic irritation, the last including the chemical changes caused by bacteria. Some authors would limit the term inflammation to the infected cases only, calling the changes incident to other forms of irritation reparative processes. From one or more of these agents acting through the local nerve supply there occurs a dilatation of the local arteries, veins and capillaries, followed by an increased rapidity of the circulation, which soon slows, and the white cells adhere to the endothelial layer and pass between these cells to become the leukocytes in the surrounding tissue. More severe irritation, and the plasma exudes still more severe, and there is a free escape of blood cells and fibrin, and the exudate is now capable of coagulation. Exudates are known from their quality as serous, fibrinous, croupous, diphtheritic, hemorrhagic, or suppurative. Serous exudates follow irritation, and also occur in passive congestion and venous stasis, as represented by forms of eczema, anasarca of advanced cardiac or renal disease and the ascites of obstructed portal circulation. The exuded fluids may become inoculated with bacteria in open wounds, or bacteria may make an exudate from the irritating power of the toxins and the peptonizing power of the bacteria. This fluid is known as pus, and consists of the plasma with white corpuscles and the fixed tissue cells converted into pus cells, with the bacteria peculiar to the infection. In fresh wounds there is an escape of a bloody, serous, albuminous fluid from the divided tissues, lymph spaces and capillaries. This fluid distends the tissues

and separates the injured surfaces, preventing or delaying healing, and, being highly albuminous, is subject to infection and decomposition. It is to relieve the tissues of these fluids that external drainage is established. The result of considering drainage as being the delivery in all cases of exudates to the surface is the probable explanation of why each operator has developed a system from his own experience with reference to this subject. The changes found in special organs are most marked. The brain, in which we would not expect much cell change or repair, is filled with lymph spaces; but is very deficient in lymphatics, the subarachnoid space serving as the absorbing area on its surface. In its substance often we will have a hemorrhage exudate remain as a local collection, then, by means of secondary changes of the blood cells and a deposit of fibrin and albumin, is developed a surrounding wall, and the exudate is now a cyst, the change requiring a few weeks to months. Injuries of the skull and brain develop cystoid scars as a result of adhesion of the membranes and shutting off of the arachnoid space, while inflammatory diseases, unless involving the surface, may cause no change in temperature, and like cysts will be located principally by pressure symptoms. It is well known that abscesses may remain for long periods in the substance of the brain without marked symptoms.

The liver and kidney are peculiar gland structures in which the excretory ducts can, to a certain extent, supply the place of lymphatics in ridding the organ of the products of metabolism. In these organs there is a deficient lymph circulation in their structure, yet a free one upon their surface and at the region of blood supply. The symptoms of inflammation will be somewhat like those in the brain, yet less marked. Inflammation near the surface causes marked disturbances, especially should perforation of the capsule occur and a greater field for absorption be invaded. The skin is filled with lymph vessels, constant repair and protection being necessary.

The lungs are rich in lymphatics, and infections or toxins are early and constantly delivered into the circulation, with the resulting reaction of fever. The onset of infections in regions rich in absorbents, as the lung, neck, axilla, or groin, is often marked by a chill, to be followed by continued temperature during the infection until reaction develops protective granulation. Repeated chills occur in regions in which accumulated products of infection are delivered at intervals into the venous circulation without the intervention of the lymph system, as in sinuses of the brain, liver, bone-marrow, uterus, or prostate, and occur in streptococcus poisoning, where the œdema and induration may cause veins to open as sinuses, or when local foci of infection occur in the circulatory system itself.

The peritoneum is but little less in area than that of the entire skin-covering of the body. Its lymphatic system is most active in the upper portion of the abdomen. The lymph vessels of the peritoneum over the small intestine are numerous, while there are few in that portion covering the large intestine, which is capable of but little absorption, as is the parietal or pelvic layer. The peritoneum covering the colon is, then, exudative, and over the small intestine absorptive, not considering the lacteals of the mucous membrane.

The fundus of all organs is deficient in lymphatics, hence acute obstruction gives cyst formation, and chronic inflammation causes shrinking and thickening of the organ. Against infection the body has a certain degree of resistance in the blood, fresh blood is germicidal to some extent, later is also a culture medium from the contained albumin. It is increasingly germicidal at a temperature of from 100° to as high as 104° F., rapidly losing it thereafter with increasing heat. The plasma free from albumin is more strongly germicidal than the blood. There is a continuous absorption of all exudates in regions supplied with lymphatics and in infectious diseases due to a carrying to the circulation of toxins and at times bacteria, and, as a result of increased tissue metabolism, there is temperature. From repeated

infections the system may become nearly or quite immune to reactionary disturbances, and local infections long retained lose their virulence through a type of continuous inoculation by absorption in minute doses and through the death or loss of virulence of the bacteria.

If this view of the action of the lymphatic system is correct in outline it affords additional light upon some obscure pathological conditions. Certain organs are subject to cysts, and the same ones, also, to sclerosis; we find that they are the organs with a deficient absorbent system. In theory, then, a chronic excess of diffusion would be followed by connective tissue due to the chronic irritation. This would be most marked in the proximity of the vessel. Acute hemorrhage may not be absorbed, and by natural changes produce cysts.

Considered in this relation to malignant disease, the condition of the lymphatic system is of the utmost importance. In fact, practically all the advancement of modern surgery of cancer has been through a study of the areas of lymph distribution involved in any malignant focus. We now have definite gland fascia areas which must be removed with, or at the time of, the removal of the original malignant growth. This is true of internal as well as external deposits. It is usually said of cancer that early operation gives a good prospect of cure.

This may be modified by the conditions of age or lymph circulation in the area involved. Thus cancer in the young is rapidly fatal, and early recurrence or metastasis frequently follows operation, the gland distribution being early involved. As compared with the young, old age with its disappearing lymph system and late operation rather than early, time alone considered, may often be more favorable for permanent recovery.

Cancer statistics as to cure improve with each decade of life, other conditions being equal.

Varieties of Drains and Drainage Adjuncts.

First is rest by splints, pressure dressing, or bed, to quiet the circulation. Second, by elevation to reduce arterial supply and favor venous and lymphatic return. Third, by massage to break up coagulated exudates and enable the lymph vessels to remove the exuded material. A good masseur, for instance, will relieve the ecchymosis and swelling of a black eye in a remarkably short time by alternate massage and rest. Fourth, moist dressings favor escape of exudate from open wounds and also favor the lymphatic circulation in closed injuries. Fifth, adjuncts to drainage in the use of solutions having affinity for moisture acting by osmosis, as glycerin or alcohol. Sixth, wound drainage is accomplished by the open method with or without secondary suture. Seventh, by separate incision. Eighth, by wicks, capillary or tubular drains or gauze packs as mechanical aids.

Capillary drains are of catgut, hair, or silkworm-gut in bundles, and serve to drain serum of small amounts in small wounds, or in large wounds where prolonged aseptic drainage is required, as after gland removal. Capillary drainage is not sufficiently free for the drainage of pus. Tubular drains deliver freely all wound secretions, and in aseptic cases should serve their purpose in from twenty-four to forty-eight hours. When of rubber they should be split from end to end instead of perforated, as it is more flexible with less danger from pressure, drains at all its length, and is easily removed. By means of a thread attached to the tube it may be removed without removal of the dressing. In septic cases the tubular drain should be left until the wound is lined with granulation tissue and is without pockets or accessory cavities, as granulation tissue is the natural protection of the system against absorption as well as being a reparative process. To freely drain the general peritoneum, nothing seems better than glass, as lymph adhesions form slowly about its surface; thus a large area is brought

under its influence. Gauze is peculiar in its action, at first being a capillary drain, later its meshes become choked with fibrin, and it no longer has capillarity, therefore it should not tightly fill the opening from which it emerges. It is a great developer of granulation, as it strains out the blood cells and fibrin from the serum, thus holding in apposition to the cut tissues elements necessary to the development of granulation. Tube drains carry away the same material, and granulation will be slower. It is this peculiar action of gauze which makes it necessary to leave it without disturbance for at least four to six days. Previous meddling will tear open the young granulations, give fresh injury, open lymph spaces, and in clean or septic cases it is usually a cause of temperature. Gauze is used in draining acute injury of the brain and in the quarantining of acute infections of the peritoneum. Aseptic operations are frequently followed by a from 1 to 3 degrees rise in temperature within from twenty-four to thirty-six hours, which is caused by absorption of blood and is a ferment fever. Temporary fever later than this may be from the intestines, but if this temperature continues the wound should be examined, as it is probable that there is some disturbance in the healing process.

We may say, then, that aseptic operations in regions rich in lymphatics, where the lymph circulation is but little disturbed, will not require drainage—as ligation of vessels in the neck, Alexander's operation, and hernias in the inguinal region. We may also say that aseptic operations in those regions in which the lymph system is removed require capillary drainage from four to six days, as auto-drainage is temporarily abolished and early removal results in serous accumulations without temperature, discovered usually when the cases should be dismissed from care, as in removal of cervical glands, cancer of the breast and axillary glands, and malignant disease of testicle and inguinal glands.

Free drainage of the stump should be employed in amputation for malignant disease where the glands are removed from axillary or inguinal region.

In regions rich in lymphatics, where operations, for septic conditions, must necessarily be made, we open fresh areas for absorption of toxins, and our endeavor should be to use upon the incised surface strong antiseptics, such as carbolic acid followed by alcohol, chloride or lime as a caustic, or in mild cases glycerin, to prevent or inhibit the action of the absorbents, and maintain the disease as a local infection. This is markedly shown in operations for the removal of bone necrosis. For the same reason the cautery is used to incise abscesses in certain regions, and also to make puncture drains of cellular streptococcus poisoning.

Iridectomy and scleropuncture in glaucoma substitute one set of lymphatics for another. In operating for the relief of increasing spina bifida a suture of two strands of silkworm-gut or catgut can be passed through the stump of the sac to temporarily deliver the spinal fluid into the tissues of the back. Experimental work is now being conducted with a view of permanently draining forms of hydrocephalus into the rich lymph system of the cervical region. In the drainage of wounds it is a good rule to make a separate incision at the most favorable point and close the original operative wound completely. This plan will improve the scar, and in large abdominal incisions will very often avoid hernia.

In aseptic operations of the abdomen involving considerable bruising or denuding of the peritoneum the pelvis should be elevated by raising the foot of the bed, the gravity acting as an aid to autodrainage, the peritoneum being capable of absorbing from 3 per cent. to 8 per cent. of the body weight in an hour.

In septic diseases just the opposite condition is desired to secure drainage and maintain the condition as a local

one, by elevating the head of the bed and also elevating the upper extremity of the patient to gravitate to the pelvis, where delivery may be made through glass tubes. This method is used in diffuse peritonitis. The diseased or septic focus should also be quarantined by a gauze pack through a separate incision, should the condition of the patient warrant the increased operative interference.

PANCREATITIS.

By W. D. Haggard, M.D.,
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The pancreas, the most sequestered organ in the abdomen, has at last yielded up in part the secrets of its obscure and incorrigible inflammations. The frequency with which it is associated and indubitably caused by gallstones make it a more easily comprehensible and less forbidding disease to the surgeon. The violence of onset and the gravity of the symptoms render it of great importance to the diagnostician. The intricacy of its physiology and the uniqueness of its varied tissue changes open an inviting field to the pathologist, while the unravelling of its complex phenomena and etiology make it at this time of peculiar interest to the pure scientist.

Inflammations of the pancreas were formerly supposed to be very rare, but the result of recent investigations and the accumulated work of clinicians have shown it to be much more frequent than it was supposed to be, and, moreover, certain curable forms may remain undiagnosed and leave no trace behind.

Acute Pancreatitis. Fitz, in his original classical description, divided pancreatitis into hemorrhagic, gangrenous, and suppurative. This is a most accurate pathological division, and in some cases the variety can be designated, but usually they shade into each other, and thus appear as progressive stages of the same process with a common cause. The clinical classification of Robson, therefore, into acute, subacute, and chronic would seem to be the most desirable.

It can occur, therefore, with or without hemorrhage, suppuration, gangrene, or fat necrosis.

Etiology. The causation of this disease, ever since it has been recognized with any degree of frequency, has been shrouded in mystery. Many theories were offered, and the explanations required further explanation. Like most things, when the true explanation is found, it turns out to be very simple. Mr. Mayo Robson, in connection with his gallstone work, observed cases of induration of the head of the pancreas with gallstones in the common duct. It had been noticed by pathologists that pus can usually be expressed from the duct of Wirsung at necropsy in these cases.

Robson has drawn our attention to the obvious fact that a stone obstructing the common duct at the ampulla of Vater must necessarily obstruct the Wirsungian duct, and also that inflammation of the bile-duct as the result of cholelithiasis is perhaps the most prominent etiological factor in the chronic, indurative, interstitial, or cirrhotic form.

Kennan, in 1896, Körte and Lancereaux, in 1898, and Oser observed this coincidence ; but Robson, who saw his first case in 1892, seemed to be the first to grasp the comprehensiveness of the occurrence and to bring it succinctly and forcibly to the attention of the profession in 1900.

The anatomy and mechanism of this process may be briefly quoted from Opie as follows:

"The orifice of the diverticulum of Vater constitutes the narrowest part of the bile channel, and here small calculi not infrequently become impacted. A small stone lodged in the diverticulum may occlude its duodenal orifice, and, too small to completely fill the diverticulum and occlude the two ducts that enter it, may convert the latter into a single closed channel along which bile may be forced by the gall-bladder. Bile thus injected into the pancreatic duct causes, as will be subsequently shown, the condition known as acute hemorrhagic pancreatitis. This lesion does not commonly follow the expulsion of a gallstone from the common duct. For its production it is necessary that the diverticulum of Vater be capacious, with a length at least greater than the diameter of its duodenal orifice."

As bearing upon the possibilities of the entrance of bile into the pancreas it may be mentioned that death in dogs has been caused in twenty-four hours by the injection of 5 c.c. of bile into the pancreatic duct.

Opie, supported by Welch's investigations, claims that the bacteriological findings have been so variable and inconstant that they do not enter into the etiological factorage, but are merely secondary invaders of injured tissue. He has placed the relationship between gallstone in the ampulla of Vater and acute pancreatitis upon the same fortified position as Robson did between the common duct stone and chronic pancreatitis. He had the previous observations of others and his own careful study of the post-mortem on Osler's case, operated by Bloodgood, of acute hemorrhagic pancreatitis followed by death, and finding a small stone at the duodenal papilla.

To this carefully worked-out case he has added the reports of seven others in which the stone was actually acting as a ball occluding the exit of both ducts into the duodenum and allowing the bile to flow directly into the pancreatic duct.

He properly infers that in many cases the stone may be temporarily lodged long enough to cause damage to the pancreas, and then escape, leaving no actual evidence of its former impaction. He also tabulates forty-one cases of acute pancreatitis with cholelithiasis, certainly enough to establish an undoubted causal relationship and food enough for further theorizing as to the role of infection associated with gallstones and productive of pancreatitis.

Robson and Moynihan contend in their monograph that the immediate and essential cause of pancreatitis is bacterial invasion, but mentions as exciting causes biliary and pancreatic calculi, trauma, gastroduodenitis, gastric and duodenal ulcer, and carcinoma, and certain infectious diseases, such as typhoid fever, influenza, and mumps. In some cases occurring suddenly in perfectly healthy persons the exact cause cannot be designated.

Fat Necrosis. Aside from the usual pathological changes which take place in gangrenous and suppurative inflammations, the distinctive tissue change in this disease is fat necrosis. This occurs when, as the result of obstruction of the excretory duct, the fat-splitting ferment of the pancreatic juice penetrates into the tissues about the organ.

The obstruction is gradual in chronic pancreatitis, and the penetration of the pancreatic juice is so slow that minute foci occur. In acute hemorrhagic pancreatitis or its later stages, gangrenous pancreatitis, the fat necrosis is more widely disseminated. The retrojection of bile into the pancreatic duct, causing necrosis of the parenchyma of the gland, dams back the pancreatic juice that is present, thus causing fat necrosis of the fatty tissue surrounding the pancreas. The fat is split into its component fatty acids and glycerin. The latter is absorbed, and the former unites with the lime salt to form yellowish-white, non-elevated, opaque spots about the size of a millet seed. They resemble miliary tubercles or carcinomatous nodules, but occurring sometimes in the subcutaneous fat and regularly in the subperitoneal fat as well as the omentum, one should be able to recognize them by this means as well as by their brittle feel, and remember that they point almost as unerringly to disease of the pancreas as jaundice does to the liver.

Symptoms. Acute pancreatitis is characterized by sudden onset of severe agonizing pain in the upper duodenum, producing syncope or collapse, recurring in paroxysms and aggravated by attempted motion. The pain is described as most excruciating, almost invariably requiring morphine for its relief. Immediately following the pain, tenderness, well-marked between umbilicus and ensiform appendix, makes its appearance.

Distention of upper abdominal zone succeeds the pains, becoming general late in the disease. Cyanosis of face and abdomen has been noted in a number of cases, and in one was the most suggestive symptom.

Usually vomiting is an initial and most annoying symp-

tom, first of food and then of bile, and sometimes blood. It may be very severe, and increases the pain, thus adding greatly to the distress of the patient, though it is not always present.

Slight jaundice from coexisting catarrh of the bile tract may be present. Facies present a pinched and anxious expression, and may be Hippocratic in its depiction of suffering and impending death.

The pancreas is generally enlarged, but the great pain, exquisite sensitiveness, and marked distention preclude an accurate palpation of the organ in its deep-seated position.

Glycosuria is rare, because, as demonstrated by Opie, the disease attacks primarily the excretory apparatus and does not affect the islands of Langerhans, which preside over the glycosuric function. In only two of forty-one cases of hemorrhagic pancreatitis, and in only three out of forty cases of gangrenous pancreatitis collected by Körte, was sugar present.

Effort has been made to recognize clinically the fat-splitting ferment in the urine by chemical test. Ethyl butyrate, carefully purified when acted upon by a fat-splitting ferment, is decomposed with the formation of butyric acid, which gives an acid reaction to the solution.

Ascites may result from pressure on the portal vein, from an induration or abscess in the head of the gland, as in a case reported by Musser. Most victims of this disease are markedly fat. The pulse is rapid and thready. Temperature is variable and not an accurate index of the severity of the condition. Hiccough sometimes occurs, and is very distressing and sometimes uncontrollable. Delirium may appear in the later stages and be quite unmanageable. Death from collapse often occurs in from two to five days, though the patient may survive longer in less acute cases, and recovery sometimes follows.

Diagnosis. Symptoms of peritonitis in the upper abdomen are suggestive of pancreatitis. Intestinal obstruction is very closely simulated. Several of the reported cases were

operated on with that diagnosis, and the real condition was ascertained only after obstruction was fruitlessly searched for. Fitz's rule, quoted by Robson, is as follows:

"Acute pancreatitis is to be suspected when a previously healthy person or sufferer from occasional attacks of indigestion is suddenly seized with violent pain in the epigastrium, followed by vomiting and collapse, and in the course of twenty-four hours by a circumscribed epigastric swelling, tympanitic or resistant, with slight rise of temperature."

When confronted with a case presenting the foregoing syndroma, one has to discriminate intestinal obstruction, biliary colic, cholecystitis, intestinal perforation, and gangrenous appendicitis.

In intestinal obstruction the distention usually will be greater and more general; in pancreatitis it is frequently limited to the epigastrium. In intestinal obstruction the peristaltic patterns can often be seen, and the waves may be heard by auscultation. The obstipation is absolute, whereas in pancreatitis the bowels may move, or at least gas is often expelled. In intestinal obstruction the vomiting finally becomes stercoraceous. Collapse is early in pancreatitis and late in intestinal obstruction. Temperature is commonly present in the beginning of pancreatitis. Its presence in the initiatory stage eliminates intestinal obstruction. The pain is lower down in intestinal obstruction and comes on more in paroxysms. Intestinal obstruction may complicate pancreatitis by strangulation or compression of the duodenum. The final diagnostic and curative measure in both is abdominal section. Fat necrosis when present is pathognomonic of pancreatitis.

Pain in pancreatitis is similar to a severe attack of biliary colic, but more intense. In biliary colic it is situated to the right of the median line and extends upward under the right shoulder. In pancreatitis it is situated in the median line and extends to the left.

In phlegmonous cholecystitis, or rupture of the gall-bladder or ducts, the acute symptoms are often preceded by tume-

faction or tenderness at the tip of the ninth costal cartilage. After peritonitis ensues from any cause the symptoms of the original disease are lost in the all-too-well-known and fatal complication.

Intestinal perforation (stomach or duodenum) will present a preceding history of the more or less classical story of these affections, and the escape of gas and the advent of peritonitis after the perforation is generally attended with an absence of liver dulness. Moreover, the vomiting which is so persistent in pancreatitis, usually subsides in perforation of the upper alimentary canal, until consecutive peritonitis is declared by its return.

In perforative appendicitis, while the initial pain may be about the umbilicus, the localization of pain, tenderness, rigidity, and perhaps swelling in the right iliac fossa, render differentiation easier than perforative lesions in the upper abdominal quadrant.

Treatment. While the futility of medicinal treatment is recognized the excessive pain requires relief, the collapse demands stimulation, and the vomiting can be ameliorated by gastric lavage.

Surgical intervention is precluded in the stage of collapse. The disease, from the indefiniteness of the symptoms, is either not suspected or the symptoms of obstruction or perforation seem to be dominant. Should operation be undertaken upon this ground, or even upon a correct diagnosis, as urged by Mikulicz, fat necrosis will at once clinch the diagnosis. The organ may be reached through the gastrohepatic or gastrocolic omentum, or by the posterior approach at the costovertebral angle.

Mikulicz definitely advises incision of the tense-walled sac, that often feels, as described by Mayo in his successful case, "like a pudding in a tight sac." An incision four inches long and three-quarters of an inch deep in the pancreas was made by Porter, followed by drainage and recovery. A large gauze drain surrounded with gutta-percha tissue is the best anterior drainage In the gangrenous or suppurative form

posterior drainage through incision in the left costovertebral angle is advised.

Roswell Park likens prompt operation in this condition to early interference in fulminating appendicitis. Mikulicz compares severe cases of acute hemorrhagic pancreatitis to an acute phlegmon in which, on account of its peculiar consistency and secretion, an unusually severe course is run. He urges incision and drainage of toxic contents, thereby escaping sepsis and further destruction of the gland.

Subacute Pancreatitis. It is well known that some cases, while presenting a sudden onset, run a less virulent course and survive a longer time. Some have been submitted to operation, and after the diagnosis was made intra-abdominally, very little or nothing was done, ending in recovery.

Robson reserves this classification of subacute pancreatitis for such cases, without marked collapse, less severe and protracted vomiting, and without such rapid and well-marked epigastric swelling. The tenderness is much less, and distention being not so great, the enlarged pancreas may be palpated, especially under an anæsthetic.

Blood or pus may appear in the fetid diarrhœa consecutive to the initial constipation. A septic temperature with rigors often occurs, and then abates, with apparent general improvement until a recurrence of acute symptoms takes place, with great weakness, loss of weight, and finally death occurs. These cases sometimes terminate in suppuration of the pancreas or pancreatic abscess, which may burrow, according to Robson (1) behind the stomach; (2) into either loin; (3) under diaphragm (subphrenic abscess); (4) along the psoas muscle (subperitoneal iliac abscess); (5) under peritoneum into left broad ligament.

Chiari reports two cases where the portion of a necrotic pancreas was passed per anum with recovery. This termination, even in pus cases, is, however, not always so favorable, and death usually takes place from prolonged sepsis or imperfect drainage.

This type of the disease being comparatively mild does

not appear to demand surgical intervention or other heroic treatment so urgently as the acute form, and, suppuration occurring, the surgical indications become clear, and incision may be made over the pus collection for drainage. After a complete examination of the relations of the abscess cavity, if found to be still retroperitoneal, posterior incision at the right or left costovertebral angle may be made, as suggested by Robson. The whole hand may be introduced, pus collections broken up, and efficient drainage instituted without danger of peritoneal contamination. Robson and Moynihan reported three successes out of five cases of suppurative pancreatitis.

Chronic (Interstitial) Pancreatitis is divided about equally between the sexes. Two-thirds of the cases occur between forty and sixty. It is usually the result of obstruction of (*a*) pancreatic calculi in the duct of Wirsung; (*b*) gallstones in the common duct or ampulla of Vater; (*c*) neoplasms, usually malignant, obstructing the outflow of the pancreatic fluid.

The pancreas is easily obstructed, because the accessory duct joins the main duct within the gland in 90 per cent., or if, as occasionally, it enters the duodenum independently, the orifice is usually so small that it is unable to allow of free exit if the main duct is occluded.

Duct obstruction constitutes a propitious condition for the invasion of bacteria, which is believed by some to be the essential cause, and the access of the bile, if it does not give rise to rapid necrosis, causes a chronic hyperplastic inflammation.

In three cases of chronic (interstitial) pancreatitis detected by the stony indurated feel of the pancreas during operation for gallstones, Riedel feared malignancy; but two of the cases recovered and remained well for a number of years, thus disproving the idea of malignancy, and the diagnosis in the third was confirmed after death. Doubtless many cases have been denied operative relief, even when the surgeon was in the abdomen, upon the supposition of the indurated head of the pancreas being malignant.

Extension of infection from inflammation of duodenum and bile tracts may be operative in its production. Moynihan reports a case of operation where chronic pancreatitis of stony hardness was found due to infection with typhoid bacilli nearly two years after the fever. The gall-bladder was drained, the bacilli were found in the discharge for weeks, and then ceased. The boy recovered.

Chronic interstitial pancreatitis may also occur from general or local tuberculosis. It results from excessive use of alcohol, just as cirrhosis of the liver does, and is said to be associated with the latter in one-quarter of the cases.

The chronic changes as the result of interstitial effusion gradually enlarge the pancreas, which presses against the common duct, giving the usual jaundice.

Symptoms. In patients with stomach pain, chronic jaundice, and emaciation, give the patient the benefit of the doubt, and consider chronic pancreatitis as well as cancer and gallstones. The patient is often a dyspeptic or gallstone sufferer. Exacerbations of epigastric pain occur, and may be replaced by a deep-seated ache. Nausea and vomiting alternate with anorexia, belching, etc. Finally, jaundice makes its appearance with attendant putty stools. Emaciation follows, and the cachexia of malignancy is simulated. Marasmus closes the scene.

In the diagnosis midepigastric tenderness serves to distinguish pancreatitis from cholangitis and cholecystitis. Undigested fibres of meat may appear in the stools. Lipura and glycosuria are late symptoms.

It is not so important to discriminate between gallstones and chronic pancreatitis, as the treatment of both is the same. In cancer of the pancreas the secondary anæmia and leukocytoses may distinguish it, and the cachexia and painless distention of the gall-bladder is corroborative. Exploratory section is justifiable in doubtful cases.

In obstruction to the outflow of pancreatic juice undigested meat fibres may be found in the feces after a meat diet. Salol, when administered in large doses, should be split into

its components—carbolic acid and salicin—by the pancreatic juice, and their absence in the urine is an accurate test.

The Mayos have reported operations upon seven cases, all recovering; four were treated by cholecystostomy, and three by cholecystenterostomy, twice to the transverse colon and once to the duodenum, the results being as good where the colon was used as the duodenum.

In the treatment appropriate operations on the bile tracts to free them from obstruction, followed by drainage, is the indication. The results have been quite satisfactory. Robson lost only one case out of twenty-two operations, and Mikulicz collected thirty-six cases with five deaths.

WILLIAM ELIAS BROWNLEE DAVIS.

IN MEMORIAM.

WILLIAM ELIAS BROWNLEE DAVIS, M.D.

By Richard Douglas, M.D.,
Nashville, Tenn.

Mr. President and Fellows: Let surgery pause and medicine slumber, for this hour is consecrated to the memory of one we all loved. This is the annual meeting of the Southern Surgical and Gynecological Association, yet Elias Davis is not among us. How strange it all seems! Who has not missed his cordial greeting, so unmistakably sincere? Who does not look for that tall, awkward form, those clear-cut, angular features, those restless, penetrating, but kindly eyes? Just a year ago, it seems but yesterday, he was with us, zealous and active as of yore; yet there was something on his face that bore the shadow of impending fate. Ruthlessly he was taken from us. Mourn him we must, forget him we cannot!

Since last we assembled, three ex-Presidents of this Association have crossed into the beyond. Grim Charon only rests upon his oars a little while ere he calls for another passenger. Quickly, almost suddenly, the summons came to Dr. Engelmann. Why should his like be taken from us? so gentle, cultured, loving, and lovable. The flowers o'er his new-made grave have scarce lost their fragrance. Sweet memories of him will linger with us always. Next to follow was J. McFadden Gaston, the Nestor of Southern surgery; a veteran of almost fourscore years; a rugged, original character, always a thinker and leader of men. His honorable and varied career came to a peaceful end November 15, 1903. Younger than either of these was Dr. Davis. Willingly, but sadly, I will review his brilliant young life; not to glorify it, nor yet to indulge in soulless persiflage, but that those of us who lived with him and after him may be inspired by his

nobility, impressed by his humanity, and imbued by his ambition.

In the quiet village of Trussville, Jefferson County, Alabama, on November 25, 1863, William Elias Brownlee Davis was born. He sprang from a line of physicians: his paternal ancestors for five generations were reputable practitioners of medicine; his father, a surgeon in the Confederacy, was killed at Petersburg, Virginia, leaving a widow and two sons impoverished by devastating war. Bereft of a father's guidance and support, these Davis brothers became the sole charge of their mother. Heroically she battled against adversity and instilled into these lads her gentle Christian spirit, and inspired them with their father's ambition and patriotism. From his earliest days Elias Davis knew what it was to work. Upon the farm he did his quota to contribute to the family support. Being of a studious and active mind, every sacrifice was made by his mother and elder brother to give him the advantages of an education. His early training was in Trussville; later we find him a student in the University of Alabama, zealous in his work, but from ill health and for want of sufficient means he was unable to complete his college course. He entered upon the study of medicine under the direction of his brother, Dr. J. D. S. Davis, and later pursued his studies in Nashville and Louisville, finally graduating from the Bellevue Hospital College in 1884. Impatient to engage in active and productive life, he formed a partnership with his brother and entered upon the practice of his profession in Birmingham, Alabama. Thus was initiated a career marvellous in its brilliancy, glorious in its achievements, and utterly sad in its sudden ending. As a lightning bolt from out the clear sky came the terrible accident which ushered into eternity the noble spirit of Dr. Davis. And what was left? A young and desolate widow engulfed in the despair of this horrible calamity; a broken-hearted brother bereft of the strong, sustaining influence and tender affection which welded their two lives as one; and two lovely little girls, not yet old enough to realize the magnitude of their misfortune. Nor was this all; a terrible gloom fell over all our Southland—the theatre of his achievements. Thousands of hearts throbbed in sorrow. Nor yet, indeed, was this all. We, the Fellows of this Association, had lost our founder, our leader, our friend, and claim the sad privilege of mingling our tears with those nearest in blood.

Shrouded in the gloom of this bereavement, is there no hope,

no consolation? Imperishable in the ashes of this magnificent ruin lie resplendent the jewels of virtue, honor, humanity, and success. These adorn the crown of his career, and in their refulgent rays we find comfort and encouragement. If to be honored by his fellowman was a part of the ambition of Elias Davis, then he attained the fruition of his wildest dreams.

Mark you how success attended every undertaking. He had been active in the medical councils of his State and the nation for fifteen years. As early as 1891 we find him succeeding Robert Battey as President of he Tri-State Medical Association of Alabama, Georgia, and Tennessee. In 1893 he was Chairman of the Surgical Section on Abdominal Surgery and Gynecology in the First Pan-American Medical Congress, and Vice-President of the second Congress. In 1900 we find him elevated to the Presidency of the American Association of Obstetricians and Gynecologists—an exalted position attained in a body where merit alone prevails. Some idea of the scope of his reputation is suggested by the fact that he was Honorary Fellow of the State Societies of New York, Louisiana, and of the British Gynecological Society. Alabama, a pioneer in educational requirements for license to practice, placed him upon her State Board of Medical Examiners. These were all notable honors; but the last and greatest of all came to him in 1901, when he was chosen President of this distinguished body. A man so conspicuously and constantly in the foreground of his profession must possess unusual traits of character, transcendent elements of success. These honors may occasionally fall by accidents of circumstance or political trickery upon the unworthy, but the profession does not reaffirm its judgment except upon the basis of merit. Individualizing the elements in the character of Dr. Davis, we find sufficient reason for his ascendancy.

This young doctor, located in the active village of Birmingham, needed not the eloquence of an Osler to teach him "the master word in medicine"; work he had always done, work of a masterful kind he was destined to do. Who can say what the initial incentive may have been? Perhaps necessity, or maybe an ambition for wealth and its luxuries, or, possibly in his boyish dreams, he was allured by the Goddess of Fame. These, one or all, may have induced him to enter into the strife of life; but being in, there is naught in his whole career to belie the statement that he battled for the advancement of science in the cause of humanity. Early in his career we find him seeking knowledge

at the side of the greatest clinical teachers in this country and abroad. Returning to his practice, he improved every available moment by laborious study. His restless and inquiring brain was not prepared to accept unreservedly the unsupported facts which find their way into medical literature. By close observation, experimentation and diligent research, he sought out the real truth for himself. Remote from university halls or laboratories, he pursued after his own way, amid inconceivable difficulties, original investigations. The association with Dr. Battey for a brief period developed his taste for gynecology and abdominal surgery, and to this special field of work he devoted all his energies.

Recognizing the educational value of medical associations, he allied himself with the principal special and general societies in this country. Impatient because of their infrequent meetings, he and his brother organized the Alabama Surgical and Gynecological Society. Meeting with only indifferent support, he conceived the possibility of an organization of wider scope. To the accomplishment of this purpose he bent all the energies of his enthusiastic nature, and as the result the Southern Surgical and Gynecological Association was organized in his office September, 1888; the revered Dr. W. D. Haggard, father of our honorable Secretary, was elected the first President, and Dr. W. E. B. Davis Secretary and active executive officer. From this hour Dr. Davis became the most active man in medicine in the South. His conception of the needs for and advantages of such a society was grand in its comprehensiveness. By personal appeals, tireless correspondence and frequent public addresses, he elicited the co-operation of every surgeon of present or prospective ability in the South; and throughout the period that he was most concerned in the upbuilding of this Association it had come to pass that he had in some way, either through kind and encouraging words or felicitous act, elicited the personal interest and individual aid of every member of our body. It must be remembered that, as Secretary, Dr. Davis' ideas of expansion ran counter to many. His motives were often misunderstood and sometimes impugned. Upon occasions he has defeated the wishes of his best friends, when he believed they were opposed to the best interest of the Association.

It must not be inferred that Dr. Davis gave himself up to this evangelical work in society organizations and attendance.

His character and reputation were attracting to him a large and laborious practice. He was recognized as a surgeon of clear conception, marked conservatism, and unusual skill. His achievements in his special line of work were, indeed, often brilliant. His contributions to medical literature were numerous, always readable and instructive. Especially interesting are his various articles upon intestinal surgery.

In this presence it is not necessary to recount the various contributions to science from Dr. Davis. I must remind you, however, that in 1892 he experimented upon 200 dogs for the purpose of determining the safest and most expeditious treatment of commoon duct obstruction. The principles established by his conclusions are: That sterile bile is inoffensive to the peritoneum; that transperitoneal gauze draining of the common duct is a safe procedure; that after removal of calculi from the common duct, suture of the duct is unnecessary, and indeed, harmful. These observations of Dr. Davis have lessened the dangers and simplified the technique of choledochotomy. It was not until six years after his work that Quenu found that symptoms of biliary intoxication developed after choledochotomy with suture of the duct wound, and that these symptoms were relieved by cutting the sutures. Davis' conclusions were based upon original and painstaking experimentation, while Quenu acted under the emergency of desperate conditions and trusted to luck for the consequences. It is gratifying to note that all surgeons in this country accord to Dr. Davis full credit for this distinct advance in this very difficult field of surgery. Our foreign confrères, through their ignorance of our literature, have not made the acknowledgment due him. This signal observation of Dr. Davis places his name along with Bobb, Sims, and Tate in the history of the surgery of gallstone, which in itself is sufficient to immortalize the man. Hepatic surgery was a favorite field of study and practice with our colleague, and his sudden taking off leaves incomplete his book upon this subject. Who can doubt that it would have been a prized contribution to our literature?

In all things Dr. Davis was a forceful man, but in nothing was this characteristic so strongly brought out as in our society debates. His advocacy of any cause was fearless. Quick to challenge all questionable statements, he would yield with sweetness and grace when in error. Intellectually combative and pugnacious, he spoke with candor and truth, and would

tolerate nothing less in his adversary. His oratory was always serious and intense, at times eloquent, but not ornate. To him our society proceedings were too important a matter for frivolity, and, as Secretary, he would insist upon expunging from the minutes all things irrelevant or improper. How frequently have we seen him rise and remind us that "we are making history; we are writing a book."

For fourteen years this man labored for a definite purpose; and it is gratifying to know that he lived to see the realization of his hopes. Beyond this, his labor was unrequited. Should we not as a body give expression to our approval and appreciation of his efforts in some becoming way? Our colleague was a provident man; his family are not in need of financial aid, but let us extend to the bereaved widow what she will value more—assurance of our sympathy and abiding interest. To his brother, our colleague, we offer the hand of true friendship, and encourage him to maintain the high name that they together have won. The little girls, Margaret and Elizabeth Davis, are wards of this Association. Let us pledge ourselves as a body to aid, shield, and protect them through life.

As we recall the personality and the incidents in his career, we are almost persuaded that the life of Dr. Davis was set aside for a special work and richly endowed with the attributes for its accomplishment. It is easy to point out here and there other Southern surgeons possessing surpassing qualifications in limited lines of work; but view this life in its totality as it evolved from its crude state amid discouraging surroundings—shackled with poverty, without facilities save of his own making—unbaffled, he worked on, and yet ere he had reached his fortieth year he was rich in professional honors and dear to the hearts of his people. Surely this is success. Parallels there may be, but I know none such—Elias Davis was the foremost surgeon of the South. He came upon the sphere of action twenty years ago; and, as a master mason is chosen to square the corners and bridge the arches in our architectural piles, so he, the master workman in our profession, was appointed to construct the Southern corner of the magnificent edifice of national medical science.

For him our profession knew no sectional limitations. From the half-dozen members of the Alabama Surgical and Gynecological Association there evolved the Southern Surgical and Gynecological Association, geographically limited for a time

by Mason and Dixon's line. Now, we are a national body, and to his wisdom, activity, tact, and courage we owe our present renown.

Whether I speak to you as citizen or as a man of science, it matters not. We are gathered from all parts of the Union with a common and single purpose—the advancement of science in the cause of humanity. No sectional lines divide us, no populistic theories infest us, no dreams of free coinage allure us, no problems of the races perplex us. Be you Puritan or Cavalier, New Yorker or Floridian, I say to you in the language of the great Lamar, "My countrymen, know one another and you will love one another." This was the spirit of Elias Davis. He loved the South and her people; he never wearied of singing the name and fame of her medical heroes. He was not content that the South should be known by a few illustrious names that tower like Alpine heights above all others. He strove to place Southern surgery upon so high a plane that none should shadow it. He played the same part, though upon a differently appointed stage, essayed by the immortal Grady; and I say to you, he would have been known to the world as a patriot had he not been known as something greater—a physician.

Geo. J. Engelmann

GEORGE JULIUS ENGELMANN.

By Lewis S. McMurtry, M.D.,
Louisville, Ky.

In the death of Dr. George J. Engelmann, of Boston, the medical profession of America sustained a great loss. He was a devoted member of the Southern Surgical and Gynecological Association, its president in 1890, and for many years did yeoman service in maintaining its efficiency and prestige. He was an earnest and indefatigable student of medical science and made numerous valuable contributions to medical literature. He was versed in various branches of learning outside the limits of the medical sciences. His thorough knowledge of both the German and English languages, together with his studies and frequent visits to Europe, gave his knowledge a broad scope. His personal acquaintance with the most eminent scientific investigators at home and abroad gave him exceptional opportunities for professional culture.

George Julius Engelmann, A.M., M.D., Master in Obstetrics, Vienna, was born in St. Louis, Missouri, July 2, 1847; only son of George Engelmann, who was born in Frankfort-on-the-Main, in 1809, and died in St. Louis in 1884; active in the practice of medicine until the time of his death, but most widely known as a botanist.

His early education was guided by his mother until 1856, when he was taken by his parents to Europe, receiving instruction in the great centres which his father sought in the interest of botanical research. He returned to St. Louis in 1858, and entered Washington University, where he was graduated with the valedictory in 1867.

His medical training he received abroad at the University of Berlin, 1867–69, at Tübingen, under von Niemeyer and von Bruns, 1869–70.

Valuable practical experience was gained as volunteer surgeon under the Red Cross in the Franco-Prussian War, in 1870

and 1871. Resuming his studies in Berlin, under von Lagenbeck, Virchow, Traube, Frerichs, and Martin, he was graduated in the spring of 1871, receiving the first medical diploma under the new German empire.

After a winter in the hospitals of Paris and London, Dr. Engelmann returned to St. Louis in the spring of 1873, entering at once upon the practice of medicine in his native city, taking the position of Lecturer on Pathological Anatomy in the St. Louis School for Midwives and the Maternity Hospital in 1874.

Dr. Engelmann spent his summer vacations in study and travel abroad, keeping in touch with his co-workers in his own as well as in foreign countries. He was one of the founders of the American Gynecological Society, later President; of the International Congress of Gynecology and Obstetrics, of which he was Honorary President in 1892 and 1899; of the St. Louis Obstetrical and Gynecological Society, and of the St. Louis Post-Graduate School of Medicine, in which he held the Chair of Diseases of Women and Operative Midwifery.

The following are some of his earlier contributions to gynecological literature: "The Difficulties and Dangers of Battey's Operation," *Transactions of the American Medical Association*, Philadelphia, 1878; "Battey's Operation: Three Fatal Cases, with Some Remarks upon the Indications for the Operation," *American Journal of Obstetrics*, New York, July, 1878; "Battey's Operation: A Brief Summary of Results Achieved in the Forty-seven Cases as Far as Reported," *St. Louis Medical and Surgical Journal*, August, 1878; to urge ovariotomy in early stages and caution against chemical antiseptics, to draw attention to "Renal Disease following Utero-ovarian Lesion," *Transactions of the American Gynecological Society*, 1889, and to the "Hystero-neuroses," 1878 and 1887, the name under which he grouped the reflex symptoms which accompany pelvic disease, leading to a more general study of those hitherto neglected neuroses.

A Peruvian urn, representing an accouchement, observed in the course of archæological investigation, led to a study of the "Posture of Women in Labor," finally to the work on "Labor Among Primitive People, Ancient and Modern," 1882, which appeared in German (Vienna, 1884), and French (Paris, 1886), as did also the "Hysteroneuroses," "Dry Treatment," and Electricity in Gynecology."

Impressed by the result of vaginal work seen in Brussels and Paris, he brought the subject before the American profession—

"Vaginal Hysterectomy and Hysterectomy by Morcellement," "History of Vaginal Hysterectomy," TRANSACTIONS OF THE SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION, 1883–84.

Other papers are: "Medical Education and Legislation," "Valedictory Address to the Class of 1892, Missouri Medical College;" "The Health of the American Girl," Presidential Address, TRANSACTIONS OF SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION, 1890; "The Menstrual Function as Influenced by Modern Methods of Training, Mental and Physical," "Presidential Address," *Transactions of American Gynecological Society*, 1900; "The Age of First Menstruation on the North American Continent," *Transactions of the American Gynecological Society*, 1901; "The Increasing Sterility of American Women," *Journal of the American Medical Association*, October 5, 1901; "Decreasing Fecundity Concomitant with the Progress of Obstetric and Gynecic Science," *Philadelphia Medical Journal*, January 18, 1902; "The True Suspended Position in Childbirth, and the Question of Priority," *Therapeutic Monthly*, April, 1902; "Birth and Death Rate as Influenced by Obstetrical and Gynecological Progress," *Boston Medical and Surgical Journal*, May 15, 1902; "The Age of First Menstruation at Pole and Equator," *American Gynecology*, March, 1903; "The Cause of Race Decline is Not Education," *Popular Science Monthly*, June, 1903.

Dr. Engelmann was a man of genial mood and affable, pleasing manners. He found his most congenial professional pursuits to be those of the scholar and scientific investigator rather than those of the active practitioner. He had a well-trained mind, and exhibited indefatigable energy in all his work.

He was twice married. In 1879 he was married to Emily Engelmann, who died in 1890, after a long and painful illness. In 1893 he was married to Mrs. Loula Clark, who survives him. In that same year he removed from St. Louis, Mo., to Boston, Mass. The winter of 1903–04 was marked by unusual prevalence of pneumonia in the northern cities of the United States. Dr. Engelmann was a victim of the disease, dying after a brief illness, at Nashua, New Hampshire, November 16, 1903.

JAMES McFADDEN GASTON.

JAMES McFADDEN GASTON.

By V. O. Hardon, M.D.,
Atlanta, Ga.

James McFadden Gaston, son of Dr. John Brown and Polly (Buford) Gaston, grandson of Joseph Gaston, was born December 27, 1824, near Chester, S. C. He attended the common schools of his native county, and obtained an academic education at Russell Place in Kershaw district. At the age of sixteen he entered the South Carolina College, Columbia, and was graduated A.B., in December, 1843; commenced the study of medicine in 1843 at his home in Chester, under the direction of his father, Dr. John B. Gaston; attended one course of lectures at the University of Pennsylvania Medical Department, and one course at the Medical College of the State of South Carolina, receiving from this institution the degree of M.D., March 6, 1846. He immediately entered upon the practice of medicine in Chester district, S. C., in partnership with his father, which relation was continued until the fall of 1852, when he removed to Columbia, S. C. At the opening of the Civil War Dr. Gaston enlisted in the Columbia Grays, and entered service at Morris Island, where he was appointed chief surgeon of the South Carolina forces under the command of Brigadier-General M. L. Bonham. Surgeon Gaston accompanied General Bonham to Richmond, and when the troops were removed to Manassas, he was assigned as medical director of the department, under Brigadier-General G. T. Beauregard. After the first battle of Manassas, Dr. Gaston, at his own request, was transferred by General Beauregard to the Third Brigade South Carolina Volunteers, under Brigadier-General R. H. Anderson, until that officer was appointed major-general. Dr. Gaston was then promoted to chief surgeon of his division, and participated in the Virginia and Pennsylvania campaigns. By special order of the surgeon-general, Dr. Gaston went to the relief of the wounded after the battle of Chickamauga, and assisted Dr.

S. H. Stout, medical director of hospitals, in the secondary ope rations at Marietta. An application was made by Surgeon Stout for the transfer of Surgeon Gaston to his department, but he was ordered instead to report to the medical director of hospitals in General Beauregard's division, and was sent to establish a general hospital at Fort Gaines, Georgia. He was subsequently in charge of a general hospital at Fort Valley, where he remained on duty until the close of the war.

After the cessation of hostilities, in 1865, Dr. Gaston went to Brazil, where he attended the lectures of the Imperial Academy of Medicine, and in 1873 received the *ad eundem* degree, entitling him to practice medicine in that country. He was offered the position of consulting surgeon of the military medical staff of Brazil, but declined. After removing with his family to the Province of St. Paulo, in 1867, Dr. Gaston practised his profession six years in the interior towns. In 1874 he removed to the city of Campinas, Brazil, and practised medicine there until his return to the United States, in 1883, since which time Atlanta has been his permanent residence. Soon after settling in Atlanta he opened a surgical infirmary in connection with his surgical practice, and in 1884 was elected professor of the principles and practice of surgery in the Southern Medical College, Atlanta, to which he devoted his best energies.

Dr. Gaston was a member of the American Medical Association, chairman of its surgical section, 1891–1892; of the Southern Surgical and Gynecological Association, President in 1892; of the American Academy of Medicine, President in 1895; of the Medical Association of Georgia, and of the American Surgical Association.

He married, November 2, 1852, Miss Sue G. Brumby, daughter of Professor R. T. Brumby, of the University of South Carolina, Columbia. Of their ten children, five married daughters survive him and one son, Dr. James McFadden Gaston, Jr.

The following editorial from the *International Journal of Surgery*, June, 1904, establishes Dr. Gaston's claim to the priority in the use of the elastic ligature for visceral anastomosis in 1884:

"We find that the elastic ligature was first used by Dr. James McFadden Gaston, of Atlanta, Ga., as a feasible method of accomplishing an opening from the gall-bladder into the duodenum in cases of permanent obstruction of the common bile-duct. He demonstrated upon dogs the practical result to be

expected when a loop of elastic was passed through the walls of each sac, by means of a needle. A successful test was the agglutination of the walls of the sac, together with a round aperture, allowing of free egress of bile, but not of regurgitation of intestinal materials. The very careful post-mortem examination upon some of the dogs thus treated displayed a large opening which had been made by a comparatively small loop. Then a smaller amount of tissue was included. In this way it was found that we had a means of anastomosis. It is somewhat unfortunate that Dr. Gaston did not continue to use this process after the Murphy button appeared, for it has since proved to be a more successful mode of union. It was due to the character of the material and the friable condition of the gall-bladder in dogs that the ligature was apparently incapable of being utilized. Dr. J. F. W. Ross, of Toronto, Canada, used the elastic ligature in a very interesting case of obstruction of the common bile-duct, and demonstrated, in 1894, ten years after its introduction by Dr. Gaston, that it was suited to the human being. The experiments of Bardenhauer, in 1888, were calculated to give additional stimulus to the use of the elastic ligature, but the Murphy button was brought out soon after this, and served to obscure the minds of those seeking for this means of effecting an opening, by offering a substitute which had all the appearance of a complete solution of the problem of anastomosis. It was here that Dr. Theodore A. McGraw showed great originality in investigating the virtues of the elastic ligature. He had probably heard of its use by Dr. Gaston in gall-bladder surgery, but evidently took up the subject on his own account, although many years after it was published by Dr. Gaston. His application of it to the stomach so as to enable a quick and satisfactory method of performing gastroenterostomy, was highly gratifying to Dr. Gaston, as was his frank acknowledgment of the priority of its use by his friend. It is fitting that the profession should understand the part that both Drs. Gaston and McGraw had in the evolution of McGraw's ligature."

Dr. Gaston died in Atlanta, Ga., November 17, 1903, greatly mourned by the people and profession. As an early President of the Southern Surgical and Gynecological Association, he endeared himself to the Fellows, who also revered him for his scientific worth and usefulness.

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